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JOHN GUTENBERG. THE INVENTOR OF PRINTING.

LANGUAGE.—No. 4.

THE INVENTION OF PRINTING.

A RUDE king of the olden time who smeared his hand with red ochre or the soot of a burning lamp, and made the impression of his palm and digits underneath a grant of land made to some feudal chieftain, was a printer in his way, and perhaps the first of his race. This was the sign-manual in its original and most literal sense, and it was the only means he had of putting his signature to any document, for it is most unlikely that he was able to write, even his own name—all

the learning at that time, what little there was, being in the hands of the priests, to whom all were indebted for the drawing up of legal documents or any instrument of writing whatever.

Then seals came into use. An impression was made in plastic clay and afterward baked. These are as old as the days of the Pharaohs, and some such, displaying their pronomens, have been dug up in modern times in the Valley of the Nile. These exhibit the kindred arts of plastic moulding and engraving, the engraving done sometimes in relief and sometimes in intaglio. At a later period came seals and stamps made of bronze, having reversed raised letters. Some of these ancient stamps may now be seen in the British Museum.

The first mention of printing is to be found in the annals of the Chinese. This was 1,120 years before the Christian Era. The art evidently originated with that people, but for reasons to be given presently, they have never advanced beyond a certain primitive stage of it, leaving them far in the rear of the printers of the Western nations. Roman Catholic missionaries have found in China evidences of the existence of what is called printing as early as 950 years before Christ. The plan adopted was to take a block of pear tree wood, squared to the dimensions of two pages of the book to be made. The writing was then executed on paper, or on whatever was used for that, with a pen, or small brush rather, somewhat like a camel's-hair pencil, dipped in a thick glutinous ink, and the sheet inverted upon the smooth surface of the block, to which the ink adhered. The paper was then rubbed off, leaving the ink upon the block. The block was then given into the hands of the engraver, who cut away all the parts not covered with ink. No press was used, but the surface being inked with one brush, the paper was laid upon it and dabbed down with a dry brush. The sheet was printed only on one side, and when taken from the block, was folded so as to bring the printed pages on the outside, and the blank ones within. The sheets were then put together and bound, making a book. The folded edges were on the outside, so that a Chinese or a Japanese book—for the same methods prevail also in Japan—looks like one with the leaves uncut.

In the middle of the eleventh century quite an advance in the art of printing was made in China. This was the invention of movable types which have each a word engraved on its face in relief. These types were about one-eighth of an inch in thickness, and were arranged in order on a backing plate, to which they were attached by means of gum mastic. As the Chinese had not advanced, and have not even yet advanced beyond *ideography*, or thought-writing—in which the written words are merely arbitrary symbols, representing things, qualities, and actions themselves, and directly without reference to the sounds of speech—the stage of the art of printing as above described, was as far as they could bring it. This was the best they could do; and under the circumstances, it was all that could be reasonably expected of them. And they have made no advance from that time to the present, either in their writing or in their printing; nor can they, until they adopt into their written language the phonetic principle.

Let us now pass over into Europe and see what is being done there in the way of printing. Time—the thirteenth century. We find here, at this time, block printing, the same as in China, but employed for a different purpose: namely, for the printing of playing cards; also for the ornamenting of fabrics, somewhat similar to the calico printing of modern times. One hundred and fifty years later and we find books made by the same process, that of block printing; among the first of which was the *Biblia Pauperum*, or "Bible of the Poor," of Koster, printed at Haarlem, in 1400. A little later and in the same style came the *Speculum Humanæ Salvationis*, or *Speculum Salutis*, "The Mirror of Salvation." There seem to have been no less than four correlated editions of this work, two in Latin and

two in Dutch, hence the confusion of titles; but all came from the same press, the press of Koster, for whom some have claimed the honor of the invention of printing. Although printing had been done in China centuries before, we must not conclude from this that the Europeans derived the art thence: indeed the facts all go to prove the contrary. But we have seen nothing as yet of printing as we understand the term. This made its advent at a later period, and was the invention of John Gutenberg, of the city of Mentz, in Germany. His claim to the honor of the invention is now generally conceded, though it has been hotly contested by the partisans of Koster of Haarlem, and many volumes have been written and much ink spilled otherwise in support of the claims of each. We propose, therefore, in the first place to make an examination into the claims of the latter, in order to discover if we can upon what they are founded.

Laurentius Janszoon, surnamed Koster, and generally known as Laurence Koster, was a native of the city of Haarlem, in North Holland, where he was born A.D. 1370. He seems to have been a resident of his native city during the whole period of his life, was at one time an alderman, and died there in 1440. Walking one day in a neighboring wood, he amused himself by cutting the initial letters of his name from the bark of the beech-tree. These he carried home with him, and

John Fust Examining the First Proof-Sheets of the Bible.

dipping them in ink, took their impression on paper for the amusement of his grandchildren. From this simple circumstance was born the idea of making types from which books could be printed, and Koster resolved to make further experiments. He next cut letters from the more solid wood. Finding the ordinary ink used in writing to be too thin for his purpose on account of its spreading on the paper, he made some that was thicker and more glutinous. He subsequently made types of lead, which proved to be too soft; lastly, he made some types of pewter. He then erected a press in his house, and began the printing of books, when the secret of the art was stolen from him—so the story runs—by one of his workmen, John Faust by name; who packed up of his master's types, and of the moulds and other tools used in making them, all that he was able to carry, and with these made his way to Mentz, in Germany, where he established himself in the printing business on his own account, and where, from the novelty of the thing, he acquired the title of doctor or conjuror, much as every ballad singer, rope dancer, or other charlatan at the present day acquires the title of "professor."

The above relation is strictly true so far as concerns the printing by Koster from wooden types, or rather from blocks of wood on which letters had been cut in relief, for block books came from his press in the beginning of the fifteenth century, of which mention has already been made; but that he ever used metallic types, or at least movable types of metal, with success, though he doubtless attempted it, is now very generally discredited. As to the theft of his secret by one of his workmen, that part of the story may be regarded as a myth. But that was the only way in which Koster could be connected with the early appearance of the art of printing at Mentz, this latter fact being indisputable. Nevertheless, the burghers of Haarlem still hold out for their townsman. They have erected in their market-place a bronze statue of Koster, and always hold a festival on the anniversary of the day upon which he is supposed to have brought forth his great invention.

In Mentz, or Mayence, as it is called indifferently, a little city on the banks of the Rhine, in Germany, was born in the year 1397 to 1399, John, son of Friclo Gansfleisch and Elsie Gutenberg his wife, the boy taking the name of his mother, a practice at that time not uncommon in Germany. Hence he is called John Gutenberg; though there is no record of his birth, no authentic autograph of his is known to exist, and the name was written in his day by other persons in several different ways. Nothing is known of his education, and the first thirty years of his life are virtually a blank to posterity. Although he is represented as having come of a patrician family, it does not appear that he was a man of wealth, for he seems to have labored all his life under pressure of pecuniary difficulties, and to have had frequent suits at law. He lived for a while in Strasburg, his residence there being fixed by suits at law in which he figured. Having failed as it is thought in business there, he returned about 1444 or 1445 to Mentz. He was still struggling with the mighty idea which his brain had conceived, but he was without the pecuniary resources necessary to develop it. At length in 1450 he found in one John Fust, a wealthy goldsmith of Mentz, a man who was willing to furnish the capital necessary for the enterprise for the sake of a share in its profits. A contract was made, in pursuance of which Fust lent to Gutenberg 800 guilders in gold at six per cent. interest. This was for the purchase of materials. Fust was also to make a further payment of 300 guilders annually for a working capital. The profits were to be equally divided between the two. It was further stipulated that in case of the dissolution of the partnership, the 800 guilders should be repaid to Fust with the interest which had accrued, the materials furnished being held as security for such repayment.

Gutenberg's first movable types were made of wood, the wood of the pear-tree. Each one had a hole bored through it, by means of which, when composing, they could be strung together on a wire. They were afterward transferred to an iron frame or chase, where they were made fast for printing, as is done at the present day. The first printing done by Gutenberg is supposed to have been that of alphabet cards, extracts from the Latin grammar, and perhaps some other school-books. Some of these too were perhaps printed from wooden blocks. No important work had as yet been undertaken, but the fact that Fust in 1452 advanced to Gutenberg an additional sum of 800 guilders, would seem to indicate that the enterprise had now reached a point where success was no longer doubtful. With two years of practice and experience, and a doubled capital, a more important undertaking was now resolved upon. This was no less than the printing of the Bible in the Latin Vulgate. After three years of persistent and unremitting labor and care, the work was completed in 1455. It consisted of 641 leaves bound in two volumes folio. It was in double columns of forty-two lines each, with the exception of the first nine pages, which have but forty lines each, and the tenth, which has forty-one lines to the column. Most of the edition was printed on paper, but toward the last a few copies were struck off on parchment or vellum. They were all brilliantly illuminated.

PETER SCHOEFFER.

These Bibles were at one time totally forgotten and thought to be obsolete, until the discovery of one of them about the middle of the seventeenth century, in the library of the celebrated Cardinal Mazarin. As this was at that time thought to be the only one of these first printed

Bibles in existence, it was called the "Mazarin Bible." The cardinal's librarian, Gabriel Naudé, himself a man of letters, a bibliomaniac, and an expert in matters of this kind, published an account of the discovery he had made, together with a description of the book; this drew attention to the subject, and led to the discovery elsewhere of "Mazarin Bibles"; for by this title are the few copies of this first edition of Gutenberg's that still remain to us, now known. Of this first edition of the Bible ever printed, nine copies on paper and six on vellum, fifteen in all, are still extant. Of the former, the edition on paper, the cities of Frankfort, Leipsic, Munich, Vienna, and Paris, each has one. One was disposed of at the sale of the Stevens collection in London, in 1873, where it brought £2,690, and is now in the library of the British Museum. The three remaining copies are in this country. One of these, belonging to the collection of the late George Brinley, Esq., was exhibited at the meeting of the Connecticut Historical Society at Hartford, in 1875. One was bought at a cost of £500 at an auction sale of books in London more than thirty years ago, for the late Mr. James Lenox, of New York City. Mr. Lenox had the two volumes rebound in London at an expense of $100, and they are now among the treasures of the Lenox library. And one is the property of Mr. David Wolfe Bruce, the retired type-founder of New York, which that gentleman bought at the sale of the Perkins library, in 1873, for $21,000, the highest price ever paid for a book, either written or printed; and that too for one in a fragmentary condition, for this is an imperfect copy: perfect as far as it goes, but some of its leaves have been lost or destroyed. Of those printed on vellum, one is in Leipsic, Germany; one is in the Royal Library in Berlin, and one was sold at the Stevens sale in London already alluded to, bringing £3,400. It also is in the library of the British Museum. This leaves three of the copies on vellum to be accounted for; but it is as far as our information extends at present.

It will be noticed that in these sales, the copies on paper have in most cases brought the higher price. This is contrary to the usual custom; books printed on vellum have generally been sold at from three to four times as much as copies of the same work printed on paper; but as priority of execution was the principal factor in estimating the value of these volumes, the copies on paper brought the higher price because they were the ones first printed. Moreover it is claimed by some that although all were struck from the same types, those on paper only were printed by the firm of Gutenberg and Fust, while those on vellum were printed subsequently by Fust alone after the dissolution of their partnership, which occurred about this time. And there is some ground for this conclusion in the difference of execution observable in the two styles. In the copies printed on paper the "register" is perfect; not only as to the pages, but also as to the lines of type, while the copies on vellum are often out of "register," showing a less skillful printer. On the other hand, this defect in the copies on vellum might be due to the difference of material, it being much more difficult to print on such a treacherous substance as moist and flabby parchment than on paper. But these copies are—both those on paper and those on vellum—marvels of the printer's art. The ink, though more than 400 years old, is still as bright and distinct as ink could be; the paper is still white and clear, and the page, with its illuminated border, is not surpassed in appearance by the best modern books. A *fac-simile* of one of these pages, slightly reduced in size, can be seen in the American Encyclopædia of Printing. Such a result could have been achieved only by the rare combination of the special talents of each of the three men engaged in the work; namely, the inventive genius of Gutenberg, the knowledge of metallurgy possessed by the goldsmith Fust, and the fine artistic sense of Schoeffer, of whom more anon.

What before had been an experiment, was now become a success, and one more

added to the number of the liberal arts, the art preservative of all arts, the art of printing. But just about this time Fust brought suit against Gutenberg for the repayment of the 1,600 guilders he had lent him, with compound interest from the date of the loan. Gutenberg could not pay him, and Fust demanded the delivery of the materials and the stock on hand, the assets of the business, which had been pledged for the debt. Gutenberg had nothing to do but to comply, and he saw his great invention, upon which he had labored so long without requital, now pass out of his hands, just at the moment when it was about to bring him a rich reward. This was a stunning blow to Gutenberg. He was now hard upon sixty years of age; and had he not been a man of great energy, and more than ordinary force of character, he must have at this juncture given up all further hopes of pushing his invention and perfecting it, and must have succumbed to circumstances. But he was not without friends. He worked on, though under great trials and difficulties, until he at length found both a friend and a patron in Dr. Conrad Hummery, who agreed to advance the capital necessary to set up another press and to start a new printing office. Moreover he had still some printing materials which were not covered by Fust's mortgage, and among these were the large types, double pica, used upon another edition of the Scriptures, printed immediately after the one already described. This was the Bible of thirty-six lines, commonly known as the Bamberg Bible, and a copy of which also is in the library of the Mr. Bruce aforesaid. With these and the money furnished by Dr. Hummery he was now enabled to stock another printing office, and to start again under favorable auspices. Though as before, the new printing office with its contents was pledged as security for the debt contracted in furnishing it, Gutenberg was allowed to remain in possession as long as he lived.

In 1465 Adolph II., Elector of Nassau, made Gutenberg one of the gentlemen of his court, in appreciation, it is thought, of his services as the inventor of an art that has preserved all arts. But the printer was himself of noble descent as we have seen, and that may possibly have influenced the Elector in making the appointment. He now removed with his printing office to Eltville, a village near Mentz; but his duties at the court of the Elector, though not onerous, required his presence there; and as he was now growing old, he leased the printing office to Henry and Nicholas Bechtermüntz, relatives of his by marriage, and so retired from active business. He received from the Elector a sort of pension, in the form of a new suit of clothes, twenty bushels of grain, and two tuns of wine annually. He died in the beginning of the year 1468, and was buried in the church of the Holy Franciscus, which was destroyed in 1472; after which there remained nothing to mark his exact resting-place until in 1837 his statue in bronze by Thorwaldsen was erected on the site formerly occupied by the church. The statue was unveiled on the 14th of August of that year amid salvos of artillery in the presence of a vast concourse of people; deputations from all the chief cities of Europe joining the citizens of Mentz to do honor to the occasion. The festival continued for three days. Strasburg and Frankfort also have statues of Gutenberg. But he needs no monument, for every printed book is a memorial of his genius.

Fust now came into possession of the press, types, and stock on hand, and thus found himself the sole owner and proprietor of the first, and just at that moment the only, printing office in the world. And this was a result which he doubtless contemplated from the beginning. Fust, besides being a goldsmith, was a professional money-lender also, avaricious and crafty. When he was applied to by Gutenberg for pecuniary assistance to enable him to develop his grand idea, he no doubt saw here a fine opportunity for a speculation. He saw how,

by the judicious investment of some money, under such conditions as he should impose, he could, by foreclosure at the proper moment, take advantage of the guileless old man,—for Gutenberg was ingenuous as well as ingenious,—and so get everything into his own hands; leaving the latter so far destitute as to be unable to become his competitor; and having thus become sole owner of the property, he could conduct the business for his own sole profit, and thus add a considerable sum to his already fast accumulating hoard. He drove a hard bargain with the printer, insisting upon terms yielding him all the advantages without any of the liabilities of a partnership.

Some time previously there had come to Mentz, fresh from the University of Paris, a young man, Peter Schoeffer by name, a native of Gernsheim, where he was born about the year 1430 or earlier. While still in Paris he had been employed by the Scribes, who were at that time numerous there, as an illuminator of manuscripts, in which capacity he had become more than ordinarily expert. He was a young man of rare intelligence and of good education, besides being possessed of great mechanical skill and inventive genius, and superadded to these substantial qualities, he had one more brilliant, that is, a fine artistic taste. He was engaged by Gutenberg and Fust to illuminate their Bibles, and was employed in the printing office, where he rendered other services. With such a rare combination of talents, he must have been a very valuable acquisition to the printers. Schoeffer made the type letters more symmetrical and otherwise beautified their forms. He also improved the quality of the ink used in printing.

When at length the partnership between Gutenberg and Fust was dissolved, and the former was forced to retire, Schoeffer, on account of his great services, past and prospective, was taken as partner by Fust in his stead. It might be thought strange that Schoeffer should cling to the sordid Fust, instead of to the more liberal minded and large-hearted Gutenberg; but here, as has often happened before, there was a woman in the case. Fust had a pretty daughter, named Christina; she was likely to be an heiress, and Schoeffer fell in love with her. Her father encouraged the match, and without hesitation consented to their marriage, which soon followed. He perhaps thought by this means to cement the union which already existed between himself and the young printer, and thus attach him more closely still to his interests.

Although in printing from movable types a great and important discovery had been made, there were still exasperating difficulties to be overcome to make it work well in practice. The delineation of the letters, somewhat defective in the first instance, became worse when their sharpness of form had been lost by use, which event very soon occurred on account of the want of sufficient hardness in the metal of which they were made. This was the principal difficulty. It was overcome, however, by Schoeffer, who discovered a better composition for the type. He also now introduced the use of a harder metal for making the matrices. But best of all he cut stamps or punches in steel, by which he was enabled to punch the matrices instead of casting them. This was the most important improvement made since the beginning, and type-founding, which before had existed only in name, now became a reality. This was the consummation of the art, and the era of printing may be said to date from this event.

Several works issued from the press of Fust and Schoeffer between the years 1455 and 1462, when the siege of Mentz occurred, and business there of every kind was suspended. The little band of printers was now dissolved and scattered. Fust had still on hand most of the Bibles in the Latin Vulgate printed by Gutenberg and himself, and taking advantage of the suspension of business in Mentz on account of the siege, he took these to Paris in order to make sale of them. He sold a number among the courtiers of Louis XI., for 600 crowns each, the

same price asked by the Scribes. But the uniformity of the printed pages, and the great beauty of their embellishments made them in all cases to be preferred to the manuscript Bibles. After supplying as many of his wealthy patrons as would buy of him at this price, and having many Bibles still on hand, he now lowered his price to sixty crowns, to place them within the reach of those who were unable to pay more. This created universal astonishment; but when at last he reduced the price to thirty crowns, and moreover produced his Bibles according to the demand, all Paris was agitated. Information was now laid against him as a sorcerer. His lodgings were searched, a great number of Bibles were found and seized, the red ink with which they were embellished was said to be his blood, and from their cheapness and the exact correspondence of their pages, the doctors of Paris judged him to be in league with the Evil One. This, together with some confusion of his name with that of a noted necromancer living in Paris a little while before, gave rise to the legend of "The Devil and Doctor Faustus." Fust was thrown into prison, and would probably have been put to death had not the king interfered in his behalf, and released him on condition that he would divulge his secret. He remained in Paris until 1466, when he is said to have died there of the plague. After the death of Fust the printing business at Mentz was carried on by Schoeffer alone until the year 1490, when he retired from all further active participation in it and was succeeded by his son. He died in 1492.

The early history of the art of printing is involved in much obscurity, and amidst conflicting statements it is not easy to arrive always at just conclusions. The account of the invention now offered is as trustworthy a one as we have been able to give after a searching examination and careful comparison of all the best authorities on the subject extant. About the early history of no other mechanical or fine-art have so many books been written. The difficulty of coming to a satisfactory conclusion is much increased by the fact that all the early chronicles of printing were written in a dead language, the Latin; and being written for the information of scholars and men of letters, rather than for that of printers, they very inadequately describe the construction and appearance of early types and the habits of early printers. The alleged inventors of printing are thirteen, a baker's dozen; and the residence of its inventor is claimed by no less than fifteen different places. After a careful investigation of the assumptions of each and all of the persons alluded to in this connection, we discover that only four of them have now living defenders, namely, Gutenberg, Koster, Schoeffer, and Castaldi, the Italian. The claims of Castaldi are supported by nobody outside of Italy. To Schoeffer we have endeavored to give that credit which seemed to be his due. His services to the art were indeed great, especially his invention of type-founding: without which the invention of Gutenberg could hardly have been a success. The contest is now narrowed down to Gutenberg and Koster, and the account here given is the only one which presents a way in which the conflicting claims of the two can be reconciled. German authors, of course, maintain the claims of Gutenberg, and reject all traditions favoring Koster; while Netherland writers insist on the priority of Koster, and accuse Gutenberg of stealing his invention. English and French authors too, while without national prejudices on the subject, have, by playing the partisan, added to the heat and bitterness of the controversy.

The invention of printing is the most important one that has been made in the history of the world since the discovery of letters; and one without which that sublime discovery would have been shorn of the greater part of its powers. It is an invention which has contributed more to the civilization and enlightenment of the world, and the diffusion of knowledge and general intelligence among men than all else combined.

JAMES COULTER LAYARD.

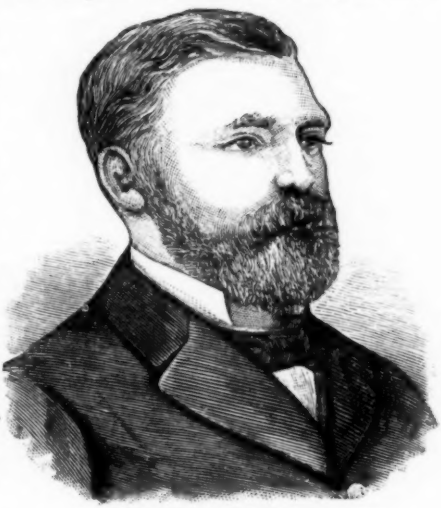
THE ENGINEERS OF THE BROOKLYN BRIDGE, AND THEIR WORK.

ON the 24th of May, the cities of New York and Brooklyn celebrated the accomplishment of one of the grandest works of mechanical skill the new world has known. Like all great consummations, the suspension bridge over the East River is the outcome of a long-talked-of project. Twenty-five or more years ago the idea of joining the two cities by means of a bridge was much discussed; but it was not until about 1865 that it began to take practical hold upon public opinion, and to engage the attention of engineers and constructors. Many difficulties presented themselves to such an undertaking; it was urged among other things that the strong current which prevails especially at certain hours of the tide in the East River would prove a very serious obstacle; then there were the great depth of the river at certain places, and the absolute necessity of elevating the bridge so much as not to interfere with the passage of vessels, otherwise the great and constantly increasing marine trade of New York would be seriously embarrassed.

JOHN A. ROEBLING.

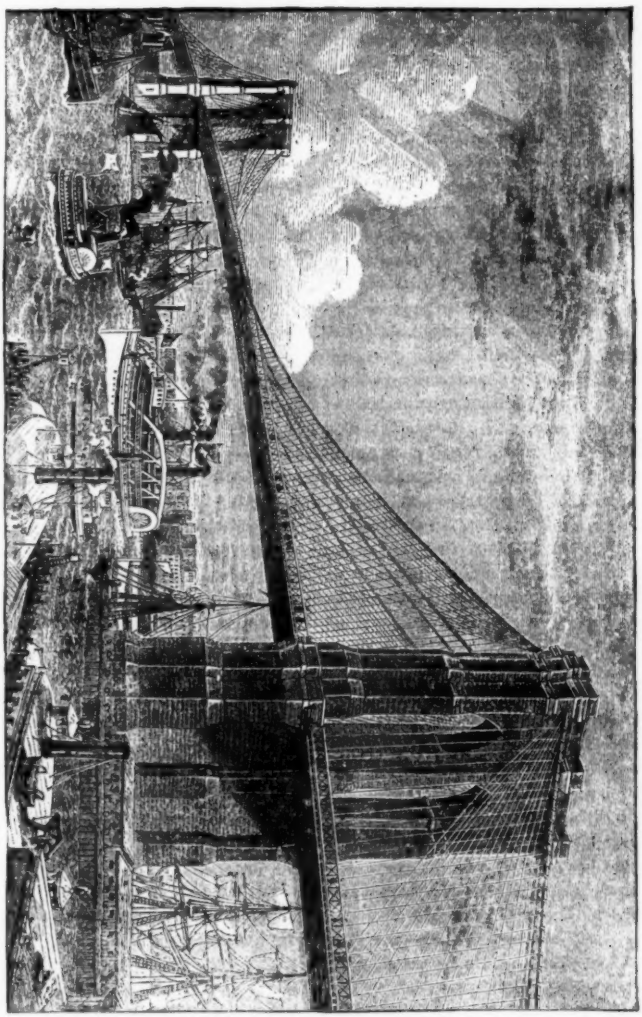
Mr. W. C. Kingsley, whose name should ever be remembered in connection with the enterprise, was so earnestly in favor of it that in 1865 he engaged an eminent engineer to draw plans and make estimates for a suspension bridge; the result of his investigations and of the further examination into the matter which followed, was the granting of a charter by the Legislature of the State of New York for the purpose of carrying into effect the construction of such a bridge. This charter made the work in great part a private undertaking. In 1875, however, it was declared a public work, and the money which had been subscribed by private parties was repaid from the bridge fund of the two cities.

In 1867 Mr. John A. Roebling, of New Jersey, was engaged as chief engineer, and he prepared and submitted a series of plans and estimates covering the whole



WASHINGTON A. ROEBLING.

work. These with a few modifications were approved by a board of consulting engineers, and a Government commission of three United States engineers, and the work of preparing the site of the foundation of the Brooklyn tower was begun on January 3, 1870. The foundations of this and also of the other tower were laid by means of caissons, the caissons being substantially a huge wooden diving-bell; that on the Brooklyn side being sunk to a stratum of hard conglomerate, about 45 feet beneath the bottom of the river. On the New York side, however, the laying of the foundation was a work of much greater difficulty; because of the



VIEW OF THE EAST RIVER BRIDGE.—THE GRAND SPAN.

nature of the sandy bottom, it became necessary to sink the caisson to the bed-rock, 78 feet below high-water mark.

Un ortunately, Mr. Roebling met with an accident in the summer of 1869, while engaged in superintending the surveys for locating the Brooklyn tower; he was standing on some timbers of the rack belonging to the ferry slip, when a boat entered, and thrust the timbers so as to catch and crush his foot; lockjaw ensued and he died sixteen days later. He was about 63 years of age; a man with a well-proportioned brain, a very active temperament, energetic and thorough-going. His perceptive faculties as indicated by the portrait were large; Constructiveness, Firmness, the organs of the upper side of the head generally were large, and the upper part of the forehead was fully developed, giving him the characteristics of reflection, breadth of view, deliberation, and executive purpose. The head was well elevated at the crown, conferring excellent poise of character, with steadfastness and emphasis. Language was large enough to make him clear in the expression of his ideas, and Benevolence strong enough to give him kindness and sympathy. He was not noted for loquacity, but rather for quiet unobtrusiveness, yet he could speak to the purpose when expedient.

The bridging of the East River had been a favorite idea with him for several years before he entered upon the work, and his previous experience as an engineer especially adapted him for it. In 1848 he contracted to erect four suspension aqueducts on the line of the Delaware and Hudson Canal. In 1851 the suspension bridge at Niagara was commenced, and completed in March, 1855; this was under his supervision—the span of 1,224 feet being at that time deemed very remarkable. Later works of Mr. Roebling's were the elegant suspension bridge over the Alleghany River at Pittsburg, and the Ohio bridge at Cincinnati; the latter was completed in 1867.

Mr. Washington A. Roebling, who had been associated with his father in some of his principal works, was regarded as the fit successor to the position of chief engineer in the bridge construction, and accordingly received the appointment. Like his father, he possesses large mechanical organs, and in general a strong and practical brain. He devoted himself earnestly to the prosecution of the work, and, like his father, became a victim, although not to the fatal extent, of an accident. In December, 1871, a fire occurred in the Brooklyn caisson. Mr. Roebling being there at the time, contracted the disease known as the "caisson disease," which made him a permanent invalid, restricting him to his sick-room. Although unable to go out, his oversight of the work never flagged. It is said that his wife has proved of very important assistance in the discharge of his engineering duties. When he became disabled she prepared herself by special studies in engineering to compensate as far as possible for his inability to be personally present at the bridge works and some valuable details are due to her. The changes which were made in the original plans of the bridge were chiefly for the purpose of adapting the structure to a future demand upon it, induced by the constant growth of the cities of New York and Brooklyn. These changes involved a larger and stronger bridge, and made a very considerable addition to its first estimated cost. The original estimate, exclusive of the land appropriated, was seven millions; the time of building five years. The actual cost when completed will be about $15,500,000, inclusive of the land; but the height of the bridge was increased five feet, the width five feet, and the cost of the foundations, owing to these and other changes, was materially increased. Steel was substituted for iron as the material to be used in the construction of both the cables and the suspended structure. Then there are station buildings and elevated railway buildings, matters not originally contemplated, and which have swelled the cost.

The length of the span between the towers is 1,595½ feet; the length between

the anchorages of the main cables 3,460 feet; between the termini 5,989 feet. At the towers the bridge is 118 feet above high-water mark, and at the center 135; the towers are 276 feet and 8 inches high. The four cables which sustain the bridge are composed of steel wires laid parallel, and bound together by an unbroken wrapping of wire; each of the wires is one-eighth of an inch thick and there are 5,000 in each cable, making a bundle 15¾ inches in diameter. The strength of the anchorages in which the cables are set may be inferred from the fact that they are vast masses of masonry 119 feet by 132 at the base, standing 90 feet above high-water mark, and weighing 60,000 tons each. The huge iron plates, one for each cable, which are held in place by this masonry, are 16½ by 17½ feet, 2½ feet thick, and weighing 46,000 pounds each. The wire in a single cable weighs 1,732,086 pounds and its strength is estimated at 170,000 pounds per square inch; the weight of each cable is 800 tons; while the weight of the whole suspended structure or central span is 6,740 tons; and the maximum weight with which the bridge can be crowded by freely moving passengers, vehicles, and cars, is estimated at 1,380 tons; this added to the weight of the suspended structure makes a total of 8,120 tons; the stress or lengthwise pull on the cables due to such a load becomes about 11,700 tons; while their ultimate strength is placed at 49,200 tons.

The platform for foot passengers is in the center and considerably elevated above the car tracks and the carriage roadways, so that the pedestrian obtains a magnificent view of the two great cities, the bay and neighboring country from the center. To the stranger who approaches New York by steamer from the Atlantic or the Sound the bridge offers a beautiful spectacle. In the distance the vast network of steel and iron slung between the needle-like towers has an airy lightness and grace, and seems to float high over the water, as some strange bird with great white wings, or a cloud of peculiar form.

A FEW REFLECTIONS ON NOSES.

WHILE the human countenance as a whole, alike upright and expressive, stamps its possessor at once with the divinity of his origin and the dignity of his design, each feature thereof, and none more prominently and pointedly than the nose, nobly comes forward to substantiate the statement, backed up and bulwarked by the whole inner man. The expressive indications of each are ever in harmony with the whole. As the face of a clock indicates time, so the face of a man tells the tale of his inner being. When the inner man is calm and tranquil each feature of the countenance harmoniously betokens the placidity within. It is no less true that when violent emotions or tumultuous passions, whether of joy, or grief, or love, or wrath, disturb or destroy that tranquillity, the countenance at once indicates the measure and the character of the tumult within. The eye ever signals the grief or the gladness, while the eyebrow substantiates these signals with its favor or frown. The mouth in its measure and form, with the lips, thick or thin, open or compressed, tells its own tale. The chin prominent or retiring shows persistence or the reverse; while the forehead that surmounts all, high or low, wide or narrow, indicates with a certainty that can not be gainsaid either the possession or the lack of power. But no feature more prominently than the nose betokens at once the cast and the character of the man. It is also the first mentioned feature in human history (Gen. ii. 7).

The nose is ever most prominent in every important enterprise in which its possessor may engage, cutting the way for him through difficulties, and ever tak-

ing the lead. Men of every class and clime, of every age and occupation, have ever followed their nose through life. Since, then, every man follows his nose, and since its characteristic is ever "go-ahead," it should never in any case receive the "go-by," nor be belittled. That man should receive no encouragement who would attempt to describe the human countenance without recognizing the nose.

While the nose may be looked upon in many lights, let us look upon it first as a marvel of measurement, and in this way adopted as

THE STANDARD OF STATURE.

In the formation of our bodies, so "fearfully and wonderfully made," the All-wise Creator has established the most exact proportions even in the minutest parts. Man's height and his breadth, when his arms are outstretched, are equal, and his nose is constituted the standard of measure for the whole. It is also noteworthy that all the single members of the body are in the middle, while all the double ones are on the sides. The nose is in the exact center of the face, as much space being above as below it, while on either side of it the parts are equal. The thumb too is of equal length with the nose, but the man who would apply his thumb to his nose is apt either to point an insult or provoke a smile. In ordinary cases from the top of the head to the beginning of the face, is one nose length, from thence to the nose is another, and from the under part of the nose to the chin is another; so the face is three times the length of the nose (Fig. 1). From the chin to the hollow of the clavicles just above the breast, is two nose lengths and from thence nine more complete the length of the body proper, and half the stature of the man. When the stature is either longer or shorter the difference is uniformly found in the length of the loins. The thigh is six times the length of the nose, and the knee proper is one and a half of its lengths. From below the knee to the instep is six nose lengths, and is thus the same as the thigh. From the instep to the sole of the foot is a nose length and a half. All this shows that in ordinary cases a man is thirty times the length of his nose.

FIG. 1.

When the arms are extended at right angles to the body the distance between the extremities is equal to the stature of the body. From the hollow between the collar bones to the joint that unites the shoulder bone to the arm is three times the length of the nose. Between the shoulder and the extremity of the elbow is six times the length of the nose, and from thence to the tip of the little finger is the same. The hand is about equal to the length of the face, and three times the length of the nose; while the sole of the foot is about the sixth part of the length of the body, and five times as long as the nose. Thus the structure of the human frame, whether greater or lesser in stature, whether considered as a whole, or in its parts separately, presents to our view an admirable and wisely adapted proportion. Every part is uniform in shape and size with its counterpart, while their regular and harmonious arrangement gives the greatest symmetry and strength. No other form or arrangement could be imagined more suitable to each part, or more advantageous to the whole. No other could so well give to man that lofty bearing, and that lordly demeanor, which constitute and characterize him as "lord of creation," at once his God-given patrimony and perpetual prerogative.

The nose may be looked at no less as

THE STANDARD OF CHARACTER.

As already said, the nose is the standard of stature, and is in general one-third the length of the face. This is uniformly the case in the Caucasian race. In the Mongolian the average is more nearly one-fourth, while in the Ethiopian it is

somewhat less, and in just about the same proportion are these races developed. Thus the Ethiopian nose is that of babyhood, and the race is yet in its infancy, while the Mongolian has attained to youth, and the Caucasian only has risen to matured manhood; all indicating that the nose is no less a standard of character than of stature. True, a man with a large nose may not always rise superior to his fellows; circumstances may prevent him, yet effort will be made, and he will very seldom, if ever, sink beneath them; whereas, it is a supposed impossibility that a man with a petty, pitiful, paltry nose can ever attain to any prominence in legislature or literature, in arts or in arms. His nose, or rather his lack of it, can never lift him up.

The nose differs in shape as well as in size, and has become not only a personal but a national peculiarity. Thus, we have the earlier, or Jewish type, which is not only characteristic of that race, but also of the Syro-Phœnician and Bedouin Arab. This type of nose, while full and aquiline, yet terminates in a somewhat sharp and drooping point, indicating a keen, selfish, wary, and suspicious disposition, and leading to the prying study of men, and the persistent scheming for worldly aggrandizement (Fig. 2).

Fig. 2.

The Grecian nose is also full, but in form straight, and in every way well-favored (Fig. 3). As far as comeliness and grace are concerned, it has been regarded as the model nose of mankind. It is not only attractive but ornamental, and sets off to the best advantage the whole countenance. It is especially becoming and beautiful in woman. Such a form of nose implies much refinement of nature, combined with high artistic taste, and indicates, as in the Greek, a strong and instinctive love of the beautiful, alike in nature and in art, qualities which in that race reached their highest development. The Grecian nose, wherever it is seen, is not so much the type of rugged power and persistent determination, as of amiability, culture, and gracefulness. It is a prominent characteristic of poets and artists, manifesting itself in the most refined taste and exquisite skill.

Fig. 3.

The Roman nose differs somewhat from these, and is markedly large, aquiline, and expressive (Fig. 4). It has been regarded as the highest type of power, and indicates the energetic, the aggressive, the subordinating. Power was the great ideal with the Romans, and the likenesses of all military leaders have presented more or less strikingly the characteristics of this nose. This was very marked both in Wellington and Napoleon. The Romans had the aggressive faculty very largely developed, as seen in their nose, and shown in their character. It is beyond dispute that the British partake largely of both, and show themselves an aggressive people. While such is the case, it is no less clear that such a type of nose very generally belongs to persons of superior intellect, high moral sentiment, and is most frequently found as indicative of great strength of mind and marked decision of character.

Fig. 4.

The negro nose, as is obvious, differs very materially from all the others, not only in being so much shorter, flatter, and wider, but in failing to present that relative prominence indicative of power. Although it occupies the higher place, yet it much lacks pre-eminent prominence. The out-pressed lips and protruding jaws assume and assert, and uniformly indicate the prominence of the animal propensities. Such a negro nose, however, does not show so much the lack of power, as the possession of a power of the beast kind and in a tendency more or less strong to garrulous jollity, self-gratification, and low cunning; and when very marked, to tawdry display, deception, and double-dealing. It exhibits a universal

lack of those lordly traits which tend to determined resolve and lofty enterprises. In short, the mouth, when the most prominent part of the face, ever betokens the predominance of the animal, and the lack of prominence alike in nose and chin constitutes their possessors the lowest of our race.

While attention has thus been directed to the nose national, yet there is still another class of noses which present their prominent peculiarities, although they have never yet risen to the prominence of being national. Such may be regarded as the nose personal, or it may rather be called the Family nose. Among these may be seen the snub nose, somewhat short and dumpy, and lacking development (Fig. 5). Although it may never have raised its possessor to the first rank of our race, yet it has made its own peculiar mark on the history of the world. Such a nose is not incompatible with a good deal of insight and humor. There is such a marked manifestation of drollery in its very make-up as to warrant the conclusion that its possessor belongs to the class of "men of infinite jest and most excellent fancy." Although not the most prepossessing in appearance, and in general indicating rather a lack of persistent power, yet it can not be denied that men with such a nose have frequently risen to great prominence in different professions. In the race of life they often outrun many whose noses were more pretentious, and give the go-by to the more regal Roman.

FIG. 5.

Another type of nose may, for want of a better term, be called the Turn-up nose. It is the reverse of the Jewish, and presents a gentle curve from the top to the tip, and has its own peculiar attractions. It indicates in its possessor a rather busy, bustling, inquisitive disposition, accompanied by no little self-conceit, and its consequent self-assurance. Its possessors are somewhat loquacious, like to speak in public meetings, and are great in after-dinner orations. They aspire to offices where they can exercise "a little brief authority." They are ever ready to propose, second, or support toasts or motions, as the case may be (Fig. 6). Such a type, however, is not once to be confounded with what may be called the hook-nose. It belongs to a class that are no better than they should be, a class who by sly and insinuating cunning and craft, contrive, oft too successfully, to cajole and circumvent the more simple and unsuspecting. Let no man with such a nose be trusted.

FIG. 6.

While we have thus looked at the nose national, and the nose personal, yet both of these have oft peculiarities more or less marked in themselves, and manifested in the dispositions of their possessors. The perpendicular length of the nose, for instance, indicates an acute apprehensiveness in anticipating the future, alike in the turn of events as well as the intentions of men. An undue extension of the tip downwards tends somewhat to melancholy. On the other hand, the horizontal length of the nose from the lip outwards indicates an inquiring cast of mind, and a desire to see and be satisfied by their own eyes rather than by the eyes of others. When the lower part of the nose becomes unduly fleshy and flabby, and withal somewhat fiery besides, this shows free, if not fast living.

While prominence indicates power, yet as all prominent noses are not similar in form, so they do not indicate similarity in power. When, for instance, the front part of the nose is full immediately above the tip, this implies a strong tendency to self-defence. When the marked prominence is a little higher up, it tends in a similar way to the defence of others. Further, when the peculiar prominence is on and above the ridge, the power assumes more of the aggressive form, not simply defence, but defiance, a delight in seeing and stirring up strife, a tendency to pick quarrels, and is alike combative and contentious. This is often a prominent feature of the Roman nose. When that

which is called the septum, and which separates the nostrils, extends in the front part of the nose below the outer sides of the nostrils, this betokens a tendency toward discovery and invention. When the prominence is a little further from the tip inward, this manifests the power and desire for arranging and combining, whether objects, words, or ideas. When the prominence is still nearer to the tip, this exhibits a power of penetrating into and analyzing the mysteries of mental or physical science. The extension of the septum or center thus below the wings or sides of the nose, indicates proportionate power in the threefold aspect thus presented.

While the prominence of the nose always indicates power, its width no less does the same. The peculiarities of this power varies with the positions on which this width is more marked. This feature of the nose forms a no less interesting and instructive object of study than does its prominences, and is no less tempting. But I do not wish to be wearisome, and as some may readily admit all, while others may regard the indications as more fanciful than real, enough has been said to lead the former to pursue the subject further, as well as to lead the latter to inquire and see whence their doubts spring. I would, therefore, now sum up the matter by simply saying, that as surely as a well-formed face should be two-thirds as broad as it is long, so a well-formed nose should bear the same proportions, and when these proportions do not hold good there is the corresponding lack of the balance of power. Where the nose is thus fitly proportioned we have men who rise high above their fellows, in every department of commendable pursuit. As an illustration of this we have a Bright, a Gladstone, and others, men who wield a world-wide influence. It need scarcely be added that in judging of character from the nose, it must ever be borne in mind that there are two mighty influences universally present and powerfully prevalent, like winds on the earth or tides in the ocean; these are surrounding circumstances on the one hand, and natural temperament, together with the amount of brain power, on the other. These do much, very much, alike in moulding the character and regulating the conduct.

REV. JOHN DUNBAR.

Dunbarton, Ontario.

SOME STATUARY.

ONCE in the night-time I heard a voice say, "Come with me." The words were uttered in tones of such irresistible power and sweetness that I could but obey and follow where it led. Whether angel or mortal I knew not, I cared not. Together we entered a great hall, so large that I could not see from one end of it to the other. This vast hall was filled with laborers, men, women, and children, and I saw that each was superintending a little band of fairy workmen, who with hammers and chisels were pounding and cutting and carving upon some kind of statuary.

Each person was intently occupied with the work of a statue that seemed to be peculiarly his own. Exceedingly fine and delicate workmanship was here being done; so deftly and swiftly were these fairy artists executing their work that much of this statuary was becoming a marvel of exquisite beauty.

I soon observed a marked resemblance between each person and his own statue. One very pleasing little child was having made such a marvelously beautiful statue that I stopped before it in admiring wonder.

"What are the chief workmen employed to-day, little one?" inquired the voice.

"Cheerfulness, Love, and Duty," pleasantly answered the child.

"Always the same head workmen," said the voice; "and very fine chiseling

you are having done; that is right, little one."

Another was a gray-haired old man beside a statue of great loveliness.

"Ah, my good man," spoke the voice "your work is being finely completed; the whole outline is one of nobleness and grace. Integrity and kindness have traced very symmetrical outlines; intelligence and goodness have impressed a fine expression over all."

Then we came to a covered statue, a handsome mantle hid it from view. The voice was angry as it gave a command to "remove this flimsy cloak of reputation." No one would hesitate to obey the voice, and the covering was quickly pulled away; when I shrank back, for a hideous deformity met my sight.

"Reputation and character do not always correspond, and sometimes the true work is made manifest. Malice, avarice, deception, and their companions have been allowed to make sad havoc here, and it is now too late to remedy the evil."

Next we came to where two women were working side by side; but very different were the two forms they were modeling out.

"What different work has been done here!" again said the voice; "yet these women have had similar tools and the same number of workmen, but how differently were they employed. Upon one sorrow was permitted to crush and damage, while on the other the good little workmen, faith and trust, took sorrow and with it carved only softened lines of beauty. Both statues are of better material than finest gold. Once they were alike badly mixed with dross, and were placed in the furnace of suffering; one came out as the finest gold purified seven times, while in the other the dross remained, only more hardened and set than before. The difference in them is owing to the different workmen employed and the manner in which they performed their work."

"For what purpose is all this statuary being made?" I inquired.

"All that are rightly worked upon are being made to adorn the great temple of the Eternal City. Do you not understand? At the beginning of every person's life there is a lump of material quarried out of eternity awaiting the chisels of time to hew and shape it into some beautiful form or into a thing of ugliness. A person's character is the material, the varied circumstances of life are the many tools ready to be used, and to each individual is given the same number of fairy workmen called mental faculties. Some of these are ever ready to seize hold of a circumstance by the handle and cut or pound away at the character after a fashion of its own.

"But these active little workers need to be controlled, for if left to themselves the strongest bear sway and ofttimes some irremediable mischief is done. So people are in great part what circumstances make them, just as any material image is what the tools make it. And whether at first the character resembles granite, bronze, marble, clay, or wood, and whether the tools are seemingly good or ill, more than all else depends upon the kind of workmen employed.

"In infancy 'tis often the will of the parent that exerts a controlling influence over the child's faculties. Even a mother's smile or frown or tone of voice, often excites to action fairy-like laborers in the little brain that begin to carve traces on the new material of the little character for good or harm, beauty or ugliness."

"I understand now," I only answered.

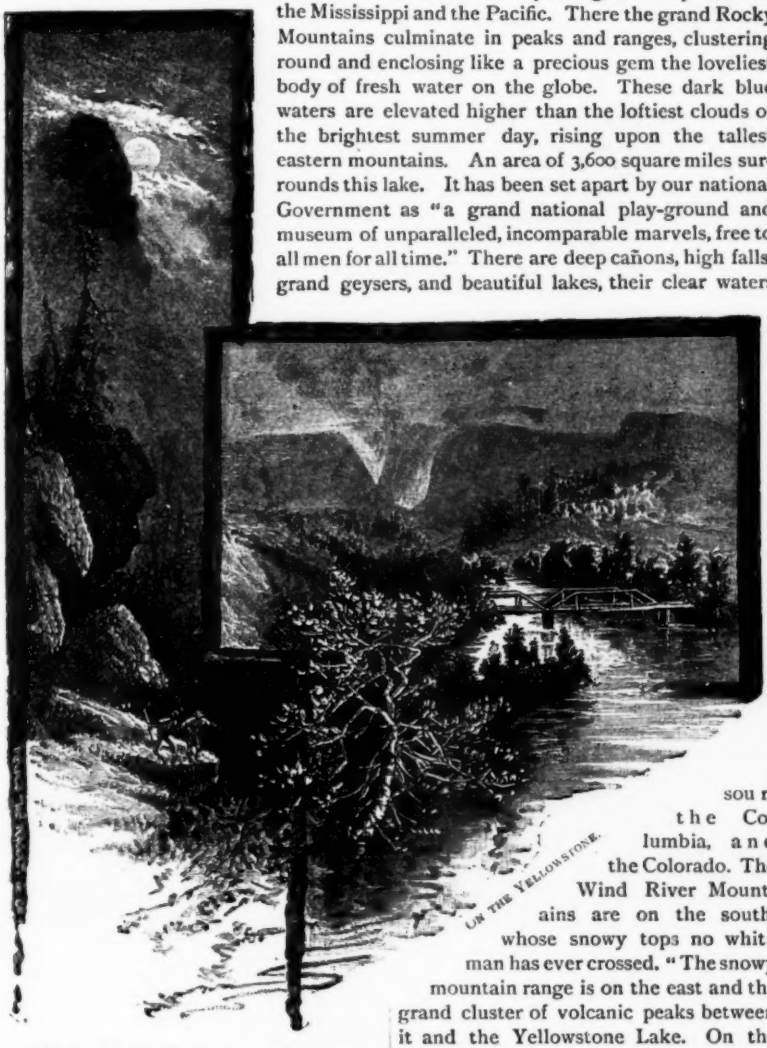
SARAH M. BIDDLE.

REQUIREMENT.

We live by Faith; but Faith is not the slave
Of text and legend. Reason's voice and God's,
Nature's and Duty's, never are at odds.
What asks our Father of His children save
Justice and mercy and humility,
A reasonable service of good deeds,
Pure living, tenderness to human needs,
Reverence and trust, and prayer for light to see
The Master's footprints in our daily ways?—
No knotted scourge, nor sacrificial knife,
But the calm beauty of an ordered life,
Whose very breathing is unworded praise—
A life that stands, as all true lives have stood,
Fast rooted in the faith that God is good?

THE AMERICAN SWITZERLAND.

THE most wonderful part of our continent—the most remarkable lake basin of the world, is found in the north-west corner of Wyoming, half-way between the Mississippi and the Pacific. There the grand Rocky Mountains culminate in peaks and ranges, clustering round and enclosing like a precious gem the loveliest body of fresh water on the globe. These dark blue waters are elevated higher than the loftiest clouds of the brightest summer day, rising upon the tallest eastern mountains. An area of 3,600 square miles surrounds this lake. It has been set apart by our national Government as "a grand national play-ground and museum of unparalleled, incomparable marvels, free to all men for all time." There are deep cañons, high falls, grand geysers, and beautiful lakes, their clear waters



ON THE YELLOWSTONE.

teeming with trout, and primeval forests crowded with game. There from the great central mountain ranges flow forth the far-reaching waters of three of the longest rivers of our continent—the Missouri, the Columbia, and the Colorado. The Wind River Mountains are on the south, whose snowy tops no white man has ever crossed. "The snowy mountain range is on the east and the grand cluster of volcanic peaks between it and the Yellowstone Lake. On the west is the main divide of the Rocky Mountains. On the north are the bold peaks of the Gallatin range and the parallel ridges, which give a northward direction to all the great tributaries of the

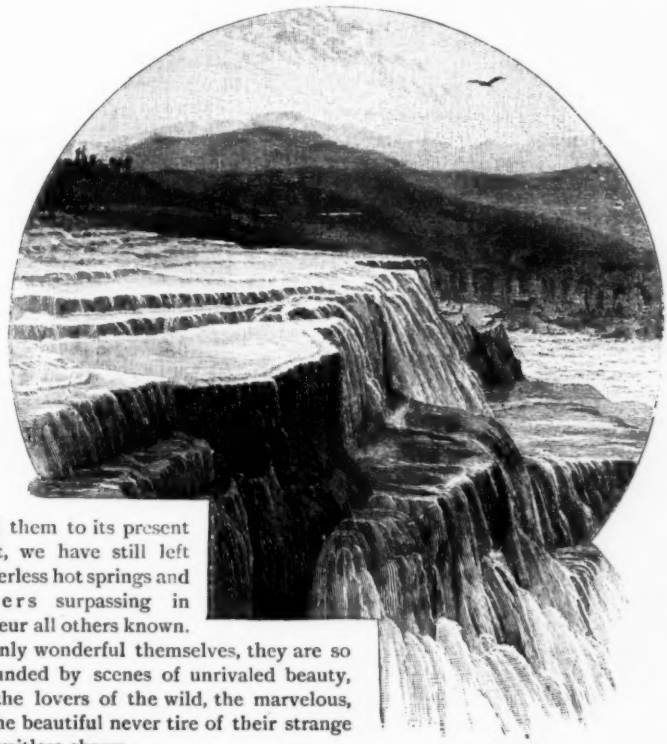
Missouri from this region." No adjectives can describe the beautiful spot—all have been exhausted upon it; picturesque, curious, wonderful, stupendous, grand, magnificent — all these and a hundred more could not define a portion of its charms.

YELLOWSTONE LAKE.

Secluded among the loftiest peaks of the Rocky Mountains the Yellowstone Lake presents some of the loveliest shore lines in the world. Its southern border, with its long narrow inlets, bears testimony to the tremendous upheavals which occurred in geologic times and gave it its special character. Pine-crowned promontories stretch into it, "islands of emerald dot its surface, and a margin of sparkling sand forms its jeweled setting." The winds passing through the mountain gorges lash it into foam, but leave it again to rest calm and unruffled, with only the gentle wavelets murmuring along its shore. "Its shores are paved with unhewn rocks — sometimes in masses, sometimes broken and worn into pebbles of trachyte, obsidian, chalcedony, carnelians, agates, and bits of agatized wood, and again ground in obsidian sand, and sprinkled with crystals of California diamonds." In these beautiful waters are an abundance of trout, but never any other kind of fish. The lake is twenty miles long and fifteen broad, and shaped like an outspread hand. Some liken it to the head and shoulders of a grotesque animal. Its superficial area is about 300 square miles, its greatest depth 300 feet, its elevation above the sea 7,427 feet. In the early morning, in the clear bright sunshine its bright green color shades to a delicate ultramarine. Over this lovely lake sail fleets of pelican, "with the majestic swan; at nightfall the low, flat islands of the lake are white with them." Around the lake hover eagles, hawks, ravens, mocking-birds, and woodpeckers. Near the lake are no snakes, but in the forest and mountain meadows are deer, elk, and sheep, and the smaller lakes are alive with otter, beaver, and mink. There is one strange bird called the guide-bird, with "innumerable sounds and gestures," hopping and flying from rock to rock before you, waiting perched upon a rock while you rest, and then leading you clear to the summit of the Grand Cañon.

There are such conclusiye proofs of the ancient volcanic action thoroughout this lake basin, that it is believed to have been the focus of a multitude of craters. An eminent geologist tells us that it has been the scene of volcanic activity as great as that of any portion of the globe. "It might be called one vast crater made up of a thousand volcanic rents and fissures, out of which the fluid interior of the earth, fragments of rock and volcanic

dust were poured in unlimited quantities. Hundreds of the nuclei or cones of these volcanic rents are now remaining, some of them rising to a great height above their rocky base. From many another point on the bare sides of the basin more than a hundred peaks may be seen, each one forming a volcanic center. Of this mighty force that once threw up these lofty mountains and raised the region round them to its present height, we have still left numberless hot springs and geysers surpassing in grandeur all others known. Not only wonderful themselves, they are so surrounded by scenes of unrivaled beauty, that the lovers of the wild, the marvelous, and the beautiful never tire of their strange and limitless charm.



MAMMOTH HOT SPRINGS.

Seventy-eight years ago Captains Lewis and Clarke explored the head-waters of the Missouri, crossing the rocky ridges, followed the Yellowstone to its junction, and found its source, a large lake, but they learned not the wonders and beauties of the "upper reaches" of the beautiful river and the lovely lake from which it flows. When afterward the Montana gold mines had drawn thitherward so many fearless gold-hunters, from the mysterious unknown Upper Yellowstone came down a story of wonders unending, with a glowing account of a lost party of adventurers fleeing from swift-pursuing Indians, and finding their way at night "by the brilliant light of a huge diamond" gleaming on the mountain-side. Trappers filled their pockets with gold nuggets, and told of a "valley where everything was instantly petrified that entered it!" "Rabbits and hens and Indians were standing like statuary among thickets of petrified sage-bush, whose stony branches bore diamonds, rubies, sapphires, and emeralds as large as walnuts." "I have gathered them myself," said one adventurer to Colonel Raynolds, who, twenty-five years ago, passed en-

tirely around the Yellowstone basin without entering it. Ten years after, the first real knowledge of this region was given us by a company led by General Washburn. They explored the Yellowstone cañons and the Yellowstone Lake shores and visited the geysers. Traveling through a terrible wilderness to reach the grandest scenes one of the party lost his way and wandered thirty-seven days alone. His story is a thrilling account of peril and suffering.

Other explorers have since followed these, surveying the lake, sketching the shore lines, and giving us charts locating the springs of the geyser basin, and unfolding to us many new pages in the book of Nature. To some parts of this wonderful region the old mountaineers had given the names of Tire Hole Basin, the Devil's Den, Hell-Roaring River, as "suggested to them some resemblance to a region their pious grandmothers had warned them to avoid." The names given them by Captains Lewis and Clarke are quite unlike those very impressive infernal ones: Wisdom River, Philosophy River, Philanthropy Creek were some of their milder titles. Sometimes, as the water flows along the valley, it "lays down in its course a pavement more beautiful and elaborate than art has ever conceived. The sulphur and the iron, with the green microscopic vegetation, tint the whole with an illumination such as no decorative painter has ever dreamed." Even the least little ornament on the sides of the basin is seen mirrored in the clear water, and the color of the sky and clouds are so vividly reflected, they seem even heightened and brightened by the constant "gentle vibration." In the little channels of the spring are the most brilliant colors, changing from the deepest scarlet to the palest cream-color. Here and there you see a delicate fibrous mass, "in the still waters incrusted with lime, looking like delicate snow-white coral."

In one place the river bursts through a plateau of thirty miles, "dotted with pine and aspen groves, varied by lakes and springs, and breaks in a winding cañon 2,000 feet in depth—now rolling over volcanic boulders, now forming fathomless pools, now lashing into furious foam, now resting in a calm crystal mirror."

At the East Fork of the Yellowstone there is a very curious mound about forty feet high, one of the ruins of an ancient spring. It is commonly known as the Extinct Geyser, East Fork of the Yellowstone. This cone is in ruins. No water issues from it now. The top of the cone is somewhat broken. It is now eighteen feet in diameter. Near the center is a hole two inches in diameter, plainly a steam vent. The inner portions of this small chimney are lined with white enamel, thickly coated with sulphur. On the east side huge masses are broken off, exposing a vertical wall twenty feet high, built up of thin horizontal laminæ of limestone. The wall on the west is about ten feet high. This was at first an overflowing spring until it built up a broad base from ten to twenty feet in height, becoming gradually a spouting spring, building up with overlapping layers like the thatch on a house until it closed itself at the top and ceased. Still more wonderful than this extinct geyser is the grand cañon of the Yellowstone.

In the grand cañon of the Yellowstone wonder is crowned with wonder. Words can not describe its grandeur and beauty. "The beau-ideals," says M. Langford, "as we gaze into the profound and solemn altitude, down, down we see the river attenuated to a thread, tossing its miniature waves and dashing with fiery strength against the massive walls which imprison it. A grander scene than this lower cataract was never beheld by mortal eyes."

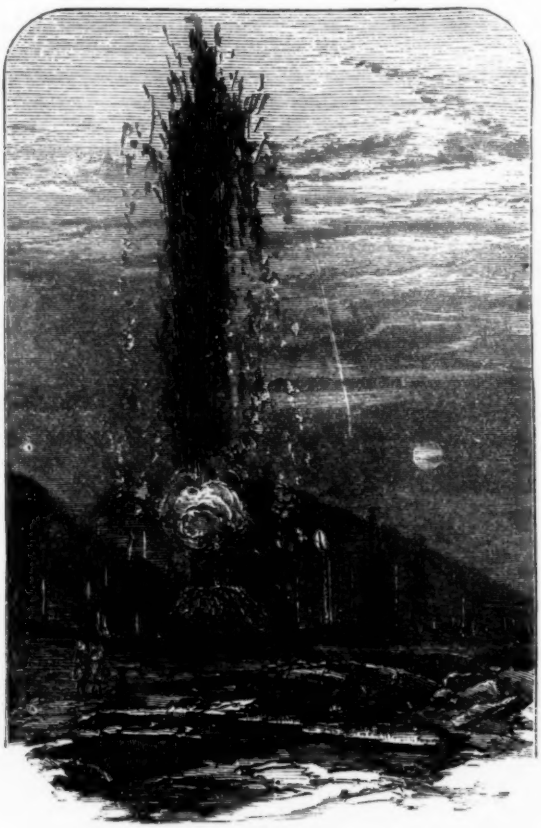
"The volume is adapted to all the harmonies of the surrounding scenery. Had it been greater or smaller, it would have been less impressive. The river, from a width of two hundred feet above the fall, is compressed by converging rocks to one hundred and fifty feet, where it takes the plunge. The shelf over which it falls is as level and even as a work of art. Its

height is a few inches more than three hundred and fifty feet. It is a sheer, compact, solid, perpendicular sheet, faultless in all the elements of grandeur and picturesque beauties. The cañon, which commences at the upper fall, is here a thousand feet in depth. Its vertical sides rise gray and dark above the falls in shelving summits, from which one can look down into the boiling spray-filled chasm colored with rainbows, glittering like a shower of diamonds. The life and sound of the cataract with its sparkling spray and fleecy foam contrast strangely with the somber stillness of the cañon, a mile below. There all was 'darkness, gloom, and shadow—here all was novelty, gayety, and delight.' Seen through the cañon, below the falls, the river for a mile or more is broken by rapids and cascades of great variety and beauty."

GRAND CAÑON AND LOWER FALL OF THE YELLOWSTONE.

Near the banks of the Yellowstone is a remarkable group of sulphur and mud springs. On the brow of a hillock, amid the green pines, vapor rises from the scorching jets of several craters and fissures. Passing over this hill we come to a remarkable cavern whence flows a transparent stream. The roof of the

cavern tapers back to the water, which is boiling furiously twenty feet from the mouth of a cavern, ejected through it in uniform jets of great force. The sides and entrance are covered with soft green sediment. Two hundred yards from this cave is what is called the Muddy Geyser, geyser is in repose, presenting a surface six or seven feet in breadth. The flow of this geyser occurs every six hours; the water rises gradually and commences to boil when about half-way to the surface, and occasionally breaks forth in great violence. When the crater is filled it is ex-



THE MUD VOLCANO.

or the Mud Volcano. It is a funnel-shaped orifice, in the midst of a basin one hundred and fifty feet in diameter, with sloping sides of clay and sand. The crater or orifice at the surface is thirty by fifty feet in diameter. It tapers quite uniformly to the depth of thirty feet, where the water may be seen when the pelled from it in a splashing, scattered mass, ten or fifteen feet in thickness, to the height of forty feet. The water is of a dark red color, depositing the substance it holds in solution in the form of miniature stalagmites upon the sides and top of the crater. Half a mile distant dull, thundering sounds are heard from the

mud volcano as often as every five minutes. Each report shakes the ground for two hundred yards or more, and the massive jets of vapor accompanying them burst forth like the smoke of burning gunpowder.

Another wonder meets the eye on the other side of the river, where in the middle of the Upper Geyser Basin is the grandest geyser of the world. Around it are other craters of boiling springs, throwing water to the height of three and four feet, but this Grand Geyser on the summit of a bank of rock is a well in the strata twenty by twenty-five feet in diameter measurement; when quiet it has a depth of one hundred feet. The edge of this basin is bounded by a heavy fringe of rock, and stalagmites in solid layers are deposited by the overflowing waters. When an eruption is about to occur the basins gradually fill with boiling water to within a few feet of the surface; then suddenly with heavy concussions, shaking the ground in every direction, immense clouds of steam rise to the height of five hundred feet, and the whole great body of water, twenty by twenty-five feet, ascends in one gigantic column to the height of ninety feet, while the steam ascends one thousand feet or more. From the apex of this column five great jets shoot up, radiating slightly from each other, to the unparalleled altitude of two hundred and fifty feet from the ground, and seem to be held at that great height for the space of twenty minutes. The earth trembles under the descending deluge; a thousand hissing sounds are heard in the air, and rainbows encircle the summits of the jets with a halo of celestial glory. The falling water flows up and bears away the shelly strata, and a seething flood pours down the slope and into the river. Three times in one afternoon has this grand geyser played for twenty minutes, then lowering its waters into the crater out of sight, the steam gradually ceasing to escape till all is quiet. The sunlight glowing on this tall, waving fountain, with its sparkling jets of deep blue waters rising high in the air, is a spectacle no pen can describe. It is the "grandest, most majestic, most terrible fountain in the world."

THE SENTINEL GEYSER, OR "OLD FAITHFU..."

Another geyser, not quite so remarkable, but more curious, perhaps, is called "The Fan." From a double orifice discharge five radiating jets to the height of sixty feet. The spray and the falling drops look like a feather fan. Its eruptions sometimes last thirty minutes. "First the steam rushes from the upper crater, roaring violently; then, suddenly ceasing, a fan-like jet of water rises from the lower crater to the height of over forty feet, playing for two minutes;

then, suddenly stopping, the stream rushes forth again; occasionally the small crater sends forth a transverse stream, thus playing into the others for hours, then subsiding into a gentle bubbling." While this geyser is in action you hear loud, sharp reports. Along the river banks craters in every shape are seen, and all around are small geysers playing at intervals. Two hundred yards from the Fan are two geysers called the Sentinel, one always playing, its waters revolving horizontally without violence. In a few years this region of the Yellowstone will probably form a grand resort for people from all lands. It is well designed for such a purpose, for here Nature is to be seen and enjoyed in her sublimest forms and robed and crowned with beauty. LYDIA M. MILLARD.

FLORENCE NIGHTINGALE.—Some one who has seen Miss Nightingale lately writes thus of her: "Her features are regular and of English cast, and her complexion fresh, with the ruddiness peculiar to English people. Her hair is brown, with no perceptible intermingling of gray. It was worn plain, with only a small lace trimming on the top of the head. She had good teeth and bright, brown eyes, which looked you full in the face while talking. Her body was well nourished, and, I am confident, would weigh at least one hundred and sixty pounds, so that she is not now, I am glad to say, the delicate, fragile creature represented by the picture referred to. She has a soft, pleasant voice, and is well informed on every subject; is a good listener and talker, and is quite eloquent on the subject of nursing and the art of caring for the sick at their homes and of hospital management, to which she has devoted so much time and thought. Although she is an invalid and rarely ever leaves her house, she has lost none of her interest in these subjects.

"She received me in her reception-room while reclining on a lounge, near which stood a table with books and writing materials and a glass of milk. She sat up several times to open letters and books, but did not move her lower extremities which were covered with a shawl. What is the character of her invalidism I do not know, but certain it is it has not in the least degree marred her intellect or lessened her sympathies for suffering humanity, nor left a trace of pain upon her frank and benevolent countenance."

THE SONG OF SUMMER.

OLD Winter is gone, with his icy throne—and well he's gone!
Young Spring, in caprice, from her cares has flown,
And Autumn—oh, how could ye hail her birth,
If I never aided the suffering earth?
I reign, and the heart I move!
I'm queen, I am loved, and love!

My smiles I dispense over rich and poor, o'er rich and poor!
My roses I throw round the cottage door;
I shower alike of my fragrant bloom,
On couch for a bride, or the dismal tomb!
I reign, and the heart I move!
I'm queen, I am loved, and love!

I'm welcomed with joy by the old and young—the buoyant young!
By rustic refrain, and by poet's song:—
The ocean is throbbing with love for me—
All nature is laughing in tuneful glee!
I reign, and the heart I move!
I'm queen, I am loved, and love!

The fullness of life, which is everywhere—is everywhere!
The dew-spangled flowers which crown my hair,
The song of the birds, and the trailing vine,
All say unto me, Oh, the earth is thine!
I reign, and the heart I move!
I'm queen, I am loved, and love!

G. H. HORR.

WOMEN IN THE INDUSTRIAL ARTS.

THE present age is everywhere a practical one. In our own country it has been inevitably such. The struggle for national independence was followed by a much longer and more prosaic struggle for bread and a home. The energies of the people, turned thus to practical affairs, gave an undreamed-of impetus to the mechanic and agricultural arts, and during the last half century the wealth of the country has multiplied with a rapidity marvelous to foreign nations. With leisure and plenty has come the recognition of other than purely physical wants, and people now demand that what was before useful be made beautiful. A curtain must not merely temper the light—it must have beauty and fitness as well. A cup must afford you pleasure while it yields refreshment. The smallest thing must be, if not really beautiful, at least quaint and curious. Hence the industrial arts, occupying the border land between the fine-arts and the arts whose only end is utility, have suddenly gained an unwonted importance. They present a constantly expanding field. As a consequence there is a call for designers and skilled artificers. In all this work what share have women, and what share are they to have?

There is no lack of occupations for women. The work of the world is forever doing—never done; and the time has come when women may have their part for the taking. There is only needful the skill which will enable them to hold their positions against all comers. There are no new employments to which women may prefer the sole claim. Why should they wish it? Competition is wholesome. Numerous occupations, in the industrial arts alone, are awaiting the patient, persevering, fully prepared women who will *dare* to take them up. In most cases the work of the pioneer has been done by women who have toiled hard and said little.

In Design the census-taker of twelve years ago found thirteen women already at work. How many additions have since been made to their number is not known (the recent census being still unavailable), but the supply is far from equaling the demand. The work is agreeable, lucrative, in every way suited to women. Designs for carpets bring from $10 to $100, according to the kind of carpet and the artistic merit of the pattern, while from the domain of Christmas cards and labels to that of wall-papers, furniture, and draperies, there is a steady call for designs at fair prices. A lady-designer of prints for a prominent Massachusetts manufactory earns twice as much as she did when a teacher.

In 1870 there was one woman architect in the United States; now there are several in the one State of New York. The time has not yet come when a fair estimate of their success can be made, but while a Cleveland lady has achieved such marvels of beauty, originality, and convenience for herself, as to be overrun with petitions for plans and hints, there is no reason to suppose that women who have been educated for the profession can not do as well. The architect of a building is not necessarily its superintendent during construction, and aside from overseeing the erection of the structure, there is no difficulty which women can not overcome if they will. "Women can unquestionably make excellent drawings," writes the Professor at Cornell University, "and I know of no reason why they can not, within certain limitations, design as well as men. In the specialty of interior work and decoration, I should suppose they might excel. But whether they would master thoroughly masonry, carpentry, and all the details of construction, a knowledge of which is essential to *good* designing of the main structure (though sadly lacking in many of our best known architects), is doubtful." To these as to other doubts of the kind, "the shortest answer of all

is—*Doing*." Women do not often lack conscience, and realizing that not only the property but the lives of their patrons are at stake, woman architects will not fail to acquaint themselves with even the driest details of their profession. Women spend a far greater part of their lives within the home than do men, and of the home women should be the planners.

Tradition ascribes the first wood engraving known in Europe to Isabella Cunio and her twin brother. Whatever the truth of this tale, it is probable that between her generation and our own the number of women who have studied and practiced engraving has reached the hundreds. More than fifty are noticed in history. The year 1870 found among the engravers of the United States but twenty-nine women. Surely there is room here.

In photography, although large numbers are at work, women have not yet emerged from the crowded ranks of mediocrity. As in other callings, too many have taken it up in a hasty way to earn bread for the passing hour. The capital of from $200 to $10,000 needed to fit out a studio is probably a barrier to some, while those who have taken this first step lack the talent or the ambition to go on.

Among the wood-carvings at the Centennial, some of the best specimens were sent by women of Cincinnati, and the work which they have exhibited at the recent Exposition in that city is highly spoken of by the local press. "Those who are capable have more orders than they can execute, and there are calls for more teachers of the art than can be supplied" (Benj. Pitman). In pottery, too, the women of that city are doing work not before attempted in this country, and Miss McLaughlin may yet follow the example of Madame Héléne de Heugist-Genlis and give to the world some of its choicest ceramic treasures. The facilities for production, however, are few; the demand for work of a high character is limited, and the women who engage in the art must be content to attain excellence, or it may be fame, but not fortune.

China painting, the painting and engraving on glass, the weaving of patterns, cabinet work, gold and silver smithing, landscape gardening—all of these arts, except, perhaps, the last—give occupation to some few women, the greater part of whom are among the unskilled and therefore poorly-paid workers. Concerning landscape gardening as a profession for women, the opinion of Fred. Law Olmstead is too important to be omitted. "There is no physical difficulty in the way of a woman's becoming a landscape gardener—none that would not stand equally in the way of her practice of medicine, or of lawn tennis. The chief difficulty, I should apprehend, would be an excess of interest in details working against comprehensive design, composition, and enjoyment of broad, simple scenery."

Embroidery has long been considered the feminine pastime. Recovering from the low state in which it has long lain, it may again be made the medium of productions which will rival the specimens preserved among the art collections of Europe. In lace woman's work has equaled the best. Little is made as yet in this country, and neither lace-making nor embroidery is a lucrative calling.

The more nearly a woman approaches the position of an independent producer, the more likely is she to attain pecuniary success. Her handiwork she can sell upon its own merits; her labor she is too often forced to sell as a woman's. The status of woman in the industrial arts is still secondary to that of man. Why is this? What are the obstacles in the way of woman's future success, and whence can help be sought?

Women's wages are lower than men's: (1st) because they lack suffrage; (2d) because they are innovators; (3d) as a whole, they are poorer workmen; and (4th) the woman who enters the labor market is, presumably, obliged to work at something.

The first assertion can not be noticed

here, further than to quote a single sentence from a letter just received from Governor John W. Hoyt. "So far as I know," he writes, "the women of Wyoming receive the same wages as men for equal service."

The opposition of employers to women, as such, is rapidly yielding to the influence of time and custom. Whatever may have been the prejudices of the past, certain it is that he who stands in need of help now more and more seldom stops to ask whether the quick brain and cunning hand belong to man or to woman. The feeling is now spending itself in the theoretical disquisitions flooding newspapers and magazines. A Minneapolis lady affirms, as the result of her own observations and the verdict of the business women of her section, that "Men are usually very kind and willing to help women on." From New York comes the assurance that "The head designers of many firms in carpets, prints, wall-papers, the precious and other metals, china, porcelain, etc.—*all*, without a dissenting voice, speak in favor of women in these industries, *if they will only become thoroughly skilled in technique*." The refusal of employers to take women who are not qualified, or if hired to give them high wages, ought not to be considered opposition. The employer must have the worth of his money. The world's business is conducted on the principle of self-interest and not of philanthropy. Unless starving, no woman of true self-respect can desire the wages of pity. Mr. Charles Rastner, Director of the Lowell School of Practical Design, says: "Young ladies can command the same salary as men if the work and originality be the same." And here appears the most serious of the obstacles to be overcome—the general want in women of the requisite qualifications.

The unskilled, uneducated woman, like the ignorant, unqualified man, is at a disadvantage among workers, and must always be so. The writer last quoted adds: "Generally speaking, the young ladies have not the energy and perseverance that young men have. Young women depend too much on the support of their relatives. As originators they lack boldness and effect in design." An overseer in the shops of the Waltham Watch Co. believes that the reason, in part, why "men earn double what women do," is, that they do more difficult work, are more thoughtful and contriving, more self-reliant and stronger." There is no woman who does not grieve to repeat such assertions, but it is best to get at the truth. The mass of women—Mr. Rastner says that there are exceptions—are charged with want of originality. Whether this effect be natural or due to long-continued lack of development, time must decide. Again the shortest answer of all is—"doing." For the other defects there are remedies. Nor is there a bright side wanting now. Mr. William B. Kendall, President of the Carpet Trade Association of the United States, and representative of the Bigelow Carpet Co., says: "I am so fully assured that women can succeed as carpet designers, that I shall use all my influence with the manufacturers to have them admitted to the design rooms. They have tact, dexterity, and facility, and I have no doubt but what they will ultimately succeed." Walter Smith, Art Director successively at South Kensington, London, and at the State Normal Art School, Boston, and now Principal of the Conservatory School of Fine-Arts at Boston, adds his testimony: "I have always been convinced that the field of industrial art is specially adapted to the capacities of women—my experience with adult women in the department of art being, perhaps, greater than that of any other man."

The physical incapacity of women is an imaginary hindrance rather than a reality. Had they been created unequal to the task, nature would not have brought nine-tenths of womankind into the world under circumstances absolutely forcing them to work. Moreover, no branch of the industrial arts calls for as much physical strength and endurance as does the position of a housekeeper having an ordinary family and but one servant.

If the obstacles in the way of woman's future success are serious, let the efforts to overcome them be the more determined. As the means of help lie almost wholly in her own hands, there is no cause for discouragement.

The first requisite is self-discipline. The concessions and courtesies of the parlor must be foregone. Social pleasures must be curtailed so far as they unfit one for the real business of life. The very memories of those pleasures must be banished during working hours. Energy, perseverance, all the qualities which help on the boy, must be cultivated by the girl. Present sacrifice must be cheerfully endured for the sake of future good, and, above all, nothing must be expected for nothing. The girl must give both time and money to thoroughly prepare herself for her work, earning the money, if need be, at some lower calling to train herself for a higher. No boy expects to earn at once the wages of an experienced man, and there is no royal road for girls.

The institutions in which an industrial art education can be had must be established and, to some extent, sustained by men and women of experience, culture, and means. Were the age less practical and more imaginative, art schools might be unnecessary. As it is, the need of them is recognized even in those European countries where art has flourished for centuries. England, France, Belgium, Prussia, Austria, Italy, all have either an extended system of art education directed and supported by Government, or numerous schools fostered by Government and conducted by individuals or associations. The good results are everywhere acknowledged in the increased value and quantity of exports, and so, of course, in an increase of work for the producers. In the United States the facilities for an education in the industrial arts are entirely inadequate to the demand. Last year more than seven hundred applicants were turned away from the Woman's Art School of the Cooper Union for want of room. Among the prominent art schools there are, besides the Woman's Institute of Technical Design in New York, the Schools of Design in Cincinnati and in Philadelphia, and the Lowell School of Practical Design in Boston. But are these schools all that they should be—all that they might be with greater means and encouragement? "Partial training," says Miss McLaren, of Edinburgh, "has been the ruin of many attempts to gain new employments for women." Here is work for another class of women, the philanthropists, who have at heart the advancement of their sex. And who so fit to inaugurate the work as an association for the advancement of women? Let a meeting be called of all women interested in art, in industrial art education, and in the success of women's work. These might effect an independent national organization, which may secure the co-operation of women of wealth, of merchants, and of manufacturers; examine critically the merits of existing schools; foster their strong points and strengthen their weak ones; encourage practical, scientific methods; where necessary, furnish the best teachers to be found in this country or in Europe; establish an annual exposition to which the schools shall send their best work, and where prizes in the shape of a more or less extended course of study abroad shall be awarded the best student. It is said that the most thorough instruction in carpet designing is to be found at the Woman's Institute of Technical Design in New York; in the designing of prints, at the Lowell Institute; in wood-carving, at Cincinnati. Whether it were better to encourage a specialty in each school, or, as far as practicable, to make all equally good in all branches, such an association could best determine. Modeling their organization to some extent after that of the Union Centrale of France (see "Art Education applied to Industry," by Geo. Ward Nichols), they could give to women's work in the industrial arts an impetus which else it will long lack.

In some of the arts it would seem that the work of the schools must be supplemented, in others superseded by apprenticeships. A recent graduate from Cornell University, the only girl that has

ever taken the course in architecture, declares that "neither the course at Cornell, nor that at the Institute of Technology in Boston, actually prepares a person for the undertaking of practical work in offices of the first class"; that women, in common with men, require an additional experience of at least a year before they are fitted to command a salary, and that "many of the best Boston and New York architects refuse to take women into their offices for the very just reason that they have no accommodations for them." The firm of Cabot & Chandler, Boston, is a prominent exception. In regard to gold and silver smithing, the words of Tiffany & Co. explain themselves: "We do not employ women as designers, as to design jewelry successfully requires some knowledge of its manufacture, and we are not aware of any shop where such information can be gained by women. The workmen learn the trade as apprentices, beginning at not over sixteen years of age. Women are employed as polishers of jewelry, but they belong to a class from which a designer is rarely developed." Here again is a difficulty calling for energetic, influential women.

The assertion of Col. Higginson that "in the new avocations, that of housekeeping and maternity, the previous special training goes for nothing," is open to a question. The special training is a perpetual bulwark between the mother and her children on one hand and possible destitution on the other. It develops the mind and character, cultivating in the woman habits and qualities which her ordinary life is not calculated to unfold, of which good effects can not fail to appear in both children and home.

A great change must be wrought in public opinion before women, as a body, can approach the highest possibilities of an industrial career. Among the so-called aristocracy, the men, notwithstanding their wealth, are generally working men. But upon the women of this class, old customs—the drifting *débris* of an older civilization—still enforce idleness. In 1870 there were in the United States 1,550,000 women over sixteen years who were not attending school, not housekeepers, and not engaged in any gainful occupation. The influence of such lives sifts down through all classes of society, and is prolific of untold evil in the lowest ranks. The woman of no definite occupation must be classed with the aimless man, and the woman having an income of hundreds or thousands must yet be made to look upon a business or professional life as essential to the development of true nobility. There is little to expect from the unyielding habits of maturity and age, but the girls, the young, hopeful, and energetic, what can they not do? Let women of competency and of wealth take up industrial pursuits and they silence at once the cry of unpopularity, raise the status of women in the working world, and afford protection and employment to the lower classes. The industrial arts offer to such women fascinations manifold and satisfactory, while the arts need them no less. With leisure, ample means, and all the inspiration which beautiful surroundings can lend, added to the vivid imagination universally conceded to the sex, what hinders these women from making valuable researches and discoveries in the delicate processes where science holds the torch to guide the hand of industry? Even precedent is not wanting; the names of Plantilla Brizio, of Anna Maria Schurmann, of Angelica Kauffman, of Mary Moser, of Felicie de Tauveau stand high alike in society and in art. These are isolated examples, but each in her age was a prophet of what woman's hands and brain should do in after-time.

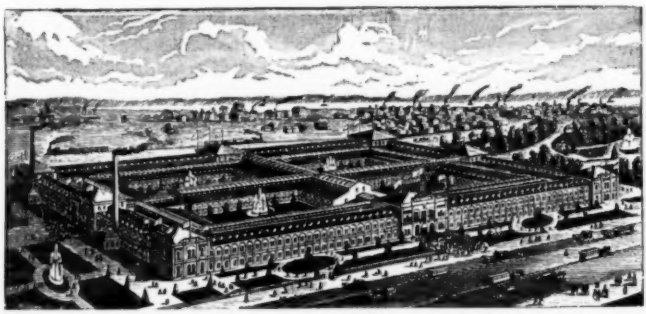
"What are we set on earth for, say? To toil;
Nor seek to leave thy tending of the vines
For all th' heat o' the day, till it declines,
And Death's mild curfew shall from work assoil.
God did anoint thee with His odorous oil
To wrestle, not to reign; and He assigns
All thy tears over like pure crystallines,
For younger fellow-workers of the soil
To wear for amulets. So others shall
Take patience, labor, to their heart and hand
From thy hand, and thy heart, and thy brave cheer
And God's grace fructify through thee to all.
The least flower with a brimming cup, may stand
And share its dewdrop with another near."

Buffalo, N. Y. ELLA C. LAPHAM.

THE SOUTHERN EXPOSITION.

THE exhibition of American products at Louisville, Ky., will mark an era in Southern commercial interests. The projectors of the undertaking had in view chiefly the awakening of the world's attention to the great resources of the South in everything related to agriculture, manufactures, mining, and commerce, and hoped to stimulate the Southern people to much greater activity in these departments. The interest which has been shown by the Southern and Northern people in the exposition has relieved them of anxiety with regard to its success, and the projectors have little doubt that its opening on the 1st of August will be in the presence of a large assembly of visitors. The place selected is most favorable, Louisville being a city of considerable extent and commercial importance itself, connected with a system of railway and steamboat communication, rendering it accessible from all parts of the Union, and having suitable accommodations for a large number of visitors. The exposition grounds are in Central Park, a pleasure-ground of eighteen acres, lying in the midst of the most fashionable resident part of the city, and flanked on one side by the principal retail business streets of the city.

The illustration shows the general plan of the buildings—the main structure being 900 by 600 feet, and covering thirteen acres. This will be furnished with every convenience and facility that experience has shown to be desirable for an exposition of this magnitude. Four lines of shafting will be placed in the southern half of this building, and ample steam-power will be furnished without cost to the exhibitors of machinery. Three thousand lineal feet of gallery, forty feet wide and twenty feet above the ground floor, will traverse the four sides of the main building, thus affording points of view for the whole interior display. There will be four courts—ornamented with flowers, fountains, and other attractions. Arrangements have been made to have two concerts each day from an orchestra of superior excellence, and in connection with the exhibits, scientific and experimental lectures will be delivered each day in a capacious hall devoted for that purpose. The buildings and grounds will be illuminated by five hundred large electric lights, and lesser lights will be introduced into all the nooks and corners of the building. The exhibition hours will be from 10 A.M. to 10 or 11 P.M. Annexes have been put up for special displays, such as horticultural, artistic, and mechanical, which have increased the area as originally contemplated many thousands of square feet.



VIEW OF SOUTHERN EXPOSITION BUILDINGS.

HER "LUCK" IN GETTING GOOD SERVANT-GIRLS.

"PLEASE, ma'am, Ellen wants to see you a minute before she goes."

"I'll be down shortly. You see, Lucy, that I am engaged now."

And Mrs. Stewart turned to her afternoon visitor with an expression of mingled vexation and distress upon her face. In reply to the look of inquiry, she said:

"Oh, these girls, these girls! how much trouble they cause us! Since my brother John went away it seems as if I have had a cook or a chambermaid every two or three months."

"Yes," rejoined Mrs. Lamson, "our domestic service needs reformation in some respects."

"Who supplies you with domestics?"

"Delany, on 14th Street."

"It is said to be a good office."

"Yes, I suppose that it is as good as any, but since John left us I have had a very unfortunate series of experiences."

"Pray excuse the question, Mrs. Stewart, but what did he have to do with your servants?" asked the visitor with a slight accent of curiosity in her tone.

"He was in the habit of selecting them for me; liked to do it, and I was glad enough to permit him. The last cook he procured was a splendid woman—well-informed in her particular line, but especially good in helping me about the children, and suggesting what should be done when any of us were ill. But good girls, you know, easily find husbands, and that was the way with Maria. She was engaged when she came, and after staying a year left us to be married."

"It seems to me, my friend, that you ought not to have more than average difficulty with domestics. Your house is a very convenient one; your family is not large, and you pay enough to command excellent help. It may be that you do not—excuse me if the suggestion seem any way impertinent, but we have known each other long enough to be frank as well as sympathetical—take enough interest in them to study their character, and to adapt yourself to them so as to elicit their interest in your home and family."

"Well, really," said Mrs. Stewart in much surprise, "am I expected to interest myself in servant-girls? You know what they are as a class. My friends generally tell me that it is simply a matter of wages with them all, and that they do not care for you beyond an expectation that you will give them the money equivalent for their labor promptly when it becomes due."

"And those friends have a similarity of experience with yourself, I suppose?"

"Yes, although most of them seem better able to bear the annoyances and crosses of domestic life than I. Oh, when one gets a real prize of a girl, I mean one who is genteel, and kind, and nice, then it is natural that we should feel interested in her."

"You intimated that your brother was successful in obtaining good domestics."

"Yes, generally, when I needed one he went to the office and selected her. But he used to say that it was very difficult to find a thoroughly competent servant at such places because good girls were in such demand that it was rarely necessary for them to apply at an intelligence office for a place. He would bring home the girl and tell me about her, what he understood of her character, and what I ought to do to render her contented and willing."

"Oh," exclaimed Mrs. Lamson, "your brother was something of a physiognomist, or a phrenologist."

"Yes, and always ready to experiment in that line, and urging me and Mr. Stewart to learn the principles of the art."

"A very easy solution of his success, and I can assure you, Mrs. Stewart, that if you will do as he advised, you will find that your domestic affairs will resume the state which in the retrospect appears so much more to your liking than the present. I can speak from personal experience."

"I know," said Mrs. Stewart, "that you have the luck or good fortune of securing good help, and scarcely ever make a change, and have often wondered at it; but then your case is different from mine."

Mrs. Lamson smiled as she rejoined, "I do not know that my chances in the labor market are better than yours or anybody's. I simply use my best judgment, aided by what I know of phrenological science. It was shortly after our marriage that Mr. Lamson and I were discussing household affairs, and to a pathetic remark of mine on expected trouble with servants as a matter of course, my husband replied, laughing, 'Why not try Phrenology and see what it can do for you?' I immediately replied, 'I will,' and that afternoon when out purchased Combe's System, and set to work to study it carefully. I remember well the pleasure it gave me when I happened on the place where he speaks of the help a knowledge of the science may be in selecting servants, and I never enjoyed anything more in my life than making experiments and observations on the heads of people who permitted me to examine them. The first time, however, I put the science to use in obtaining a domestic was a considerable trial; it seemed as if I never should find a person who could meet all my tests, and the woman whom I finally took home appeared so unfavorably in the eyes of my husband that I was almost persuaded to send her away at once; but full of faith in Combe, I said, 'Give the poor thing a chance,' and had the satisfaction of finding that she was a prize indeed."

"The testimony of two witnesses is true," said Mrs. Stewart, looking at her visitor admiringly. "I think that I shall have to try your method. Will you have the kindness to advise me in the choice of books, and give me a suggestion now and then?"

"With pleasure. I am myself but a student in the realm of human nature, to which Phrenology is one of the grand gateways, and a fellow-student would be to me most acceptable. You must know that in studying the character of others we are led to study ourselves more and more, and the result of earnest work of this kind is such practical knowledge that we can adapt ourselves to those we meet, and so promote the usefulness of social intercourse. In our homes such knowledge leads us to be kind and considerate, especially of those who perform the drudgery of household service. We can make allowances for their ignorance and coarseness, and give them that timely instruction and encouragement which nearly every one will gratefully accept when she sees that you are sincere in your expression of interest."

"I am reminded, dear Mrs. Lamson, of a case Miss Phelps told me about. She said that you had a girl for a long time whom her mother tried and found utterly good for nothing, incorrigibly obstinate, and very irritable. You, on the contrary, pronounced her energetic and capable. I mean Lydia—Lydia Castleton, I think was her name. I remember it because of the astonishment your opinion caused the Phelpses, and when Julia and I have been comparing notes in household affairs, she has several times alluded to it."

"Yes, I happened to be without a girl. You know I keep but one, and Lydia came to me after her discharge by Mrs. Phelps. I was not altogether pleased by her appearance, but she was in much distress, and after a little talk I obtained her confidence. She told me that on account of her bad temper she could not please people. I said, 'You can stay with me for a while at any rate, and we shall see what can be done with that bad temper.' She was somewhat trying at times, but I managed to get along with her very well after a month or two. She was the best laundress I ever had, and very kind to my Alice, who was then only ten months old. In fact, I never saw greater delight and devotion in a hired-girl than Lydia showed when she was permitted to have the care of Alice. Her mother instincts were very strong. She is married now and doing nicely. She even

accepted my advice with regard to the man she married."

"How remarkable!" exclaimed Mrs. Stewart, clasping her hands in wonder. "You don't mean to say that you went so far as to care about what sort of a husband your servant-girl fished up?"

"Why not? The philosophy I learned from reading Combe, Spurzheim, Browne, and other writers on Phrenology taught me the duty of helping others as I had opportunity. Ah, my friend, we must look upon our kitchen and house helps as something more than machines out of which is to be ground a certain amount of service for a certain amount of pay. Kindness, courtesy, good counsel, sympathy, are not lost on them. I believe that it is the great lack of such treatment which makes so large a proportion of them careless of their employers' interests, and in too many cases gives a bias to vice and evil ways."

Mrs. Lamson rose to go, and as the ladies parted at the door, Mrs. Stewart remarked, "I'm in earnest about studying Phrenology with you, and will begin whenever it suits your convenience."

"Very well," replied Mrs. Lamson, "expect me day after to-morrow, at 3 o'clock for the first lesson."

MIRA EATON.

HOW SOME CHILDREN GET MORAL TRAINING.

THE *Christian Weekly* published the following sketch not long since of what is unfortunately too frequent in the home-life of the better class of people. Unconsciously, or indifferently, well-educated fathers and mothers sow the seeds of evil or quicken the propensities in their little children, and afterward lament and chide their own work.

Scene in a library—gentleman busy writing—child enters.

"Father, give me a penny?"

"Haven't got any—don't bother me."

"But, father, I want it. Something particular."

"I tell you I haven't got one about me."

"I must have it—you promised me one."

"I did no such thing. I won't give you any more pennies—you spend too many. It's all wrong. I won't give it to you, so go away."

Child begins to whimper.

"I think you might give me one; it's real mean!"

"No—go away! I won't do it, so there's an end of it!"

Child cries, teases, and coaxes. Father gets out of patience, puts his hand in his pocket, takes out a penny and throws it at the child.

"There, take it, and don't come back again to day!"

Child smiles, looks shy, and goes out conqueror; determined to renew the struggle. in the afternoon, with the certainty of like results.

. . . . . .

Scene in the street—two boys playing—mother opens the door and calls to one of them, her own son.

"Joe, come into the house right away."

Joe pays no attention.

"Joe, do you hear me? If you don't come in right away I'll give you a licking."

Joe smiles, and continues his play—companion is alarmed for him, and advises him to obey.

"You'll catch it if you don't go, Joe."

"Oh, no, I won't; she always says so, but never does. I ain't afraid."

Mother goes back into the house greatly put out, and thinking herself a martyr to bad children.

. . . . . .

The writer thus comments upon the above:

"That's the way, parents; show your children by example that you are weak, undecided, untruthful, and they learn aptly enough to despise your authority and regard your word as nothing. They graduate liars and mockers, and the reaping of your sowing will not fail."

WHAT IS INSANITY?

FOR the past twenty-five years the literature of insanity has expanded its territorial limits to such a degree as to take precedence of all other departments of medicine, except chemistry. This has been chiefly due to the progress made by physiology in its alliance with organic chemistry as an expounder of the physical basis of many of the phenomena observable in living things. Affording, as it were, a clue to the why and the wherefore of so many intermediate stages of action, always more or less obscure in their connection and mutual dependence, physiology, when possessed of this thread of Ariadne, has not been slow in its march through the various labyrinths of mental action, whose passages, whether straight or tortuous, presented themselves before the individual explorer. When sight has reached its limits, and neither instruments of precision nor analyses, whether quantitative or qualitative, nor correspondences, nor analogies have been able to reach a satisfactory final resultant, some bold, adventurous spirit has not hesitated to swing himself over a yawning chasm of speculation, and with feet resting on air, and hands clutching a single strand of untried strength, has proceeded, in the midst of primeval darkness, to unfold the Eleusinian mysteries of the depths below. But since no plummet reaches bottom there, no echo comes back to the inquiring call; the last inquirer, like the first, leaves the riddle still unsolved.

From out all these stores of accumulated inquiries and recondite researches into the philosophy of mental action, considered either as a power or a function, and which stand among the hoarded treasures of modern science, the wisest men have only been able to draw an outline map of human intelligence, with here a mountain and there a river, with here an emotional volcano and there an arid plain. But no one has yet marked the precise spot at which these streams are bridged, these mountains tunneled; nor told us, again, how the great caravans of thought are formed or fed, or transported amid the obstacles which beset their way, nor how they protect themselves against the inimical hosts of passion which hang perpetually upon their flank and rear. And still less has any philosopher explained the originating point within us of that

> "Light that never was on sea or land,
> The consecration and the poet's dream"

If this hazy and filmy atmosphere has ever surrounded the constitution of the human mind, so as to render it a realm of speculation to all men in all ages; if even in health it is indescribable, indefinable, and as elusive under pursuit as the verge of the horizon, how much more so is it when disorder has usurped the throne of reason, and is playing its own wild strains upon the key-board of the faculties and the passions! No wonder, then, that in the early times, when

such a thing as the nervous system, with its ramifying network of telegraphic threads, was unknown, and its mysterious function of disseminating sensation and motion was undreamed of, insanity was regarded as a possession by evil spirits. This was the doctrine not only believed in by the masses, but taught by physicians and priests, and accepted by the educated mind of the day. Montaigne, in the diary of his journey into Italy, speaks of witnessing in a chapel at Rome the treatment addressed to a poor lunatic or demoniac by the officiating priest, "who attacked the poor patient with his fists and spat on his face by way of assailing the demon. The man did nothing but grind his teeth and make faces when they presented the Host to him, and every now and then muttered *si fata volent*, for he was a notary and knew a little Latin." Such was "high art" in the medical practice of the 16th century, although to speak more truly, insanity at that time was considered less a disease than a possession, and the bodily ill-health accompanying it was looked upon as the effect rather than the cause of the mental disturbance. The priest accordingly took precedence of the physician, and metaphysics became the guide of medicine.

The earliest opinion thus formed of the nature of insanity is shown to have been one regarding it solely as a spiritual disorder, but of unlocalized origin, and imported into the system. Something had absorbed, entered into, and possessed itself of the individual. Relief must come from exorcism, which meant ejectment; and as the flesh shared, through spiritual saturation, the contamination which stained the mind, and man was corporeally as well as incorporeally full of the devil, so the treatment required a combination of poundings with prayers. First came a blow, then an invocation; next a second blow, followed by a command to depart; and this repeated until the "possessed" one was mauled into some sort of quiescence. Expostulations were alternately addressed to the individual patient and to the evil spirit within him, and there was no stint of anathemas, as may be easily imagined, nor failure of blows to emphasize the rhetoric of the speaker. This bi-personification of a lunatic was the suggestion of priests—it was reaffirmed by physicians and adopted by the jurisprudence of every succeeding age down to the present; for, under the common law of England as imported by the colonists into America, any one might confine a lunatic and might *beat him or use such other means as are necessary for his cure.*

Meanwhile the progress made by physiology and chemistry in searching out and unfolding the laws of our animal economy, soon overshadowed the metaphysical dogmas which had formerly controlled the educated mind on the subject of insanity. A halt was called, and men began to mistrust the foundations upon which their predecessors had formulated their ideas of insanity and its treatment. They found that the blue-devil of melancholy and depression, or the red-devil of exaltation and violence would tremble and yield to remedies unaccompanied by blows or incantations of any sort. These physical remedies were such as physicians used in their ordinary practice; while to give them a better opportunity of acting, a certain degree of seclusion of the patient was found necessary, and different moral surroundings than he had been exposed to. In other words, treatment was to be compounded of medicine and environment. These conclusions, when arrived at, led the way very naturally to an antipodal theory of insanity, and placed its origin chiefly upon a physical basis, in opposition to a purely spiritual one. This was progress, but not an entire solution yet of the problem of mental disorder. There are intellectual as well as moral perversions of thought and conduct, not demonstrably accompanied by physical, meaning bodily disorder. To a certain extent, then, the spiritual theory of insanity is correct, but beyond that, and when we enter the department of therapeutics, it is distanced and over-

reached by the materialistic school. Absolute truth, therefore, lies with neither. Hence it must lie between both. And so, in fact, it does.

Man being everywhere recognized as a creature of sentiment as well as intellect, and the connection between mind and organization remaining as inscrutable as ever, it seems the part of wisdom to accept the limitations which the Creator has put to explorations into the essence of life or mind, and to address ourselves to such inquiries as experience shows to be within the range of demonstration. The functions of organization are plainly within the reach of the philosopher. They have been pretty thoroughly explained by physiologists, and become more transparent still in the laboratory of the chemist. But here the thread ends. Here mind, whether in health or disease, remains "a vast illimitable ocean, without height, depth, or bound"—a final fact which no analysis can penetrate.

The most satisfactory stage of this perplexing inquiry has at last been reached by taking whatever is good and defensible from both foregoing systems, and accepting them as reliable factors upon which to build, either in explanation of the origin and causation of insanity, or to ascertain the true direction which successful treatment should follow. Resting upon these conclusions, modern scientists are in general agreement, therefore, that insanity is not a disease exclusively of body or of mind, and not localized in any special way, but a disease rather of relation between the functions of the body and the faculties of the mind, each representing within its sphere an aggregation of actions dissimilar in kind, yet correlated for ulterior purposes relating to the interior and exterior life of the individual.

It is upon this principle that the treatment of insanity is based at the present day. The moral sentiments are appealed to, through appropriate surroundings, just as much as the physical disturbances are sought to be rectified by suitable medicines; and as surroundings always cost more than do the actual necessaries of life, so the great increase in the cost of maintenance of the insane is the result of discovering that environment takes precedence of specific drugs, and is the leading factor in the restoration of mental health. That which would be justifiable economy in another class of hospitals becomes parsimony here, for the wants of the human mind are so much multiplied under the expanding influences of civilization, that new accessories must be created to satisfy its hunger for the beautiful and the encouraging, whenever it has ceased to be able, through embarrassing weakness, to control its faculties in action, or to free itself from the folds of a harrowing delusion against which it has vainly fought on some disadvantageous battlefield of private life.

JOHN ORDRONAUX.

STUDY IN THE MEDICAL PROFESSION.—A paragraph in the *Medical News* of Louisville is very pertinent to this subject at this day, viz.: "'Art is long, time is short, opportunity fleeting, experience deceptive and judgment difficult'—such were the serious reflections of the Father of Medicine after he had labored with the problems many years and accomplished more than perhaps any man who has practiced the healing art. In these days when so many doctors may be found who are little better than professional loafers, so many who discourage the reading of medical works, who express their contempt for original research and scoff at medical journals; regarding the accumulation of money as the only test of professional shrewdness and gullibility of the people at large, to excuse the title under which they thrive the following relative to the life of Dr. Geo. B. Winston, from the *St. Louis Courier of Medicine*, is refreshing: 'A friend once remarked to him, "Doctor, what necessity is there for ceaseless labor and study at your time of life?" With a look of astonishment, never to be forgotten, he replied,

"My dear sir, I am under bonds to do it. When I offered my services to this community there was an implied covenant on my part that, so far as God gave me strength and ability, I would use them for gathering up and digesting all that has been said or written in regard to the diseases to which the human flesh is heir; and if I should lose a patient because of my ignorance of the latest and best experience of others in the treatment of a given case, a just God would hold me responsible for the loss, through inexcusable ignorance, of a precious human life, and punish me accordingly; and whenever I get my consent to be content with present professional attainments, and trust my own personal experience for success, I will withdraw from practice and step from under a weight of honorable obligations, which, with my best endeavors to meet them honestly and conscientiously, are still sometimes almost heavier than I can bear." ' "

HISTORY AND PHILOSOPHY OF HYDROTHERAPEUTICS.*

GENTLEMEN: Applied from the earliest antiquity to the treatment of certain affections, cold water did not take its proper place among the resources of our profession till almost the very epoch in which we live. It was as a result of the efforts of a simple peasant, a kind of country quack, and not till after his empirical employment of the remedy, that scientific labors were undertaken to explain the effects, and to determine the indications of cold water applications.†

At Graefenburg, a village of Austrian Silesia, lived, at the commencement of this century, a certain Priessnitz, a very observing and intelligent man, who had noted the beneficial effects of cold water treatment on sick animals confided to his care. Imagining that diseases impregnate a man as liquids do when they penetrate a sponge, he maintained that in order to cure them it sufficed to remove morbid impurities from the cutaneous surface by repeated bathings and the promotion of the excretory function of the skin. He therefore applied cold water to the treatment of the greater part of the diseases, and modified successfully the divers procedures of hydrotherapy which he put in practice. At first he employed sweatings followed by cold affusions, then advised wrapping the patient in a wet sheet, and, finally, cold baths. He obtained by this mode of treatment marvelous cures, which spread his fame far and wide.

Soon were seen flocking from all parts of Europe sick people seeking remedial aid from the healer of Graefenburg, and the village hovels disappeared to make way for numerous hotels, which soon became insufficient, so great was the num-

* A lecture to his students by Professor Dujardin-Beaumetz. Translanted from advance sheets by E. P. Hurd, M.D., for the Boston *Medical and Surgical Journal.*

† Hippocrates, in his treatise on "Air, Waters," etc., insists on the uses of cold water in the treatment of diseases. The Romans made great account of hydrotherapy, and a certain Charmis maintained that all diseases were curable by cold water alone. Celsus, Aretæus, Cœlius, Aurelianus, all pronounced in favor of cold water medication, and recommended treating fevers by this means. Then it fell into desuetude till the seventeenth century.

In 1638 Louis Septala recommended cold douches; then a Belgian, Hermann Van der Heyden, employed them in all diseases, and Foyes, an Englishman, advocated hydrotherapy with great enthusiasm.

In 1712 appeared a dissertation by Frederic Hoffman, having for title, *De aqua medicina universali* and showing the marvelous success which attends the therapeutic use of cold water; the system of treatment advocated spread rapidly in Germany.

In Great Britain, Wright, Gregory (of Edinburgh), and especially Currie, all of whom attempted a physiological explanation of the action of cold water, gave a powerful impulse toward the employment of this method.

In Italy, Giannini Vallisnieri Cocchi became partizans of hydrotherapy. [This was about the middle of the last century.] Pomme, who wrote in 1765, was about the only French exponent of the new method. Then comes the era of Priessnitz, who early in this century gave so great an impetus to the water treatment, and stimulated scientific inquiry, the results of which are seen in the numerous and able physiological treatises whose authors are mentioned in the text.

ber of patients, which kept increasing every day. Moved by this success, the Austrian Government shortly appointed a commission which gave officially to Priessnitz the direction of the "hydropathic" establishment which he had founded, and a few years after the institutor of systematic hydrotherapeutics died crowned with fortune and with glory.

Such is the curious beginning of modern hydrotherapy, which, it will be seen, owed its popularity to the most gross empiricism. More recently the labors of Scoutteten, of Schedel, of Fleury, of Beni Barde, in France; of Chiapponi in Italy; of Johnson, and of Manby Gully, in England; of Bell and Nicanor Rojas, in America; of Roser, of Lersch, of Pleniger, in Germany, have given a strictly scientific and medical character to the study of hydrotherapeutics, and it is from their contributions that I shall draw material for the several considerations into which I now enter.

Physiological Action of Cold.—Numerous investigations have been made the last few years into the physiological action of cold, and of cold water in particular. I shall refer more especially to the valuable study of Winternitz.*

Whenever you apply a cold substance, such as ice or cold water, to any part of the body, you determine perturbations in the nervous system affecting the cerebro-spinal axis, and especially the great sympathetic. These phenomena are variable as the application of the refrigerant is of greater or less duration; if the chilling be of short duration, the tactile sensibility is at first augmented; if it be prolonged, all the modes of cutaneous sensibility disappear; a fact which has been utilized in the production of local anæsthesia for minor surgical operations. If, finally, you cease the refrigeration, the sensibility appears anew with a certain degree of hyperæsthesia.†

But the most profound modification, and that which effects the most happy results, from the stand-point of therapeutics, is the perturbation occasioned in the vasomotors. Under the influence of reflex action,* following cold water applications, the capillaries are seen to become constricted, the peripheral heat to diminish, the cutaneous secretion to cease, the skin to become pale, the muscular elements to contract, giving rise to the phenomenon known as goose skin; at the same time the heart's pulsations diminish, the arterial tension augments, as Delmas, of Bordeaux, has shown, and the patient experiences a general chill.

All these symptoms disappear with a

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* Winternitz, Die Hydrotherapie auf Physiologischer und klinische Grundlage, Vienna, 1877.

† Cold raises, lowers, or abolishes the excitability of the sensory nerves, and Richardson has shown the modifications, varying according to the duration of the refrigeration. When the temperature of the skin is a little below 35° C., vascularization becomes more active, and sensibility more exquisite. When the integument is cooled still more, sensibility undergoes diminution, and at eight degrees below zero it is abolished altogether, to reappear as the temperature returns to the normal.

These modifications of temperature have been noted by Winternitz, and with the æsthesiometer of Sieveking by Helmholtz, by the determination of the quickness of our sensory impressions. From 36° C. to 38° C., (96° to 100° Fah.,) this velocity is seventy-two metres a second; with lowering of the temperature it becomes ten times less.

These same modifications of sensibility are produced when the cooling body is applied to the trunk of a nerve of sensation, and these applications produce first hyperæsthesia, then a period of complete anæsthesia.

The experiments of Waller, of Rosenthal, of Eulenburg, of Weir Mitchell, etc., are very instructive and convincing. Richardson, "Action of extreme Cold on the Nervous System," Medical Times, vol. ii., 1825. Winternitz, op. cit. Waller, On the Symptoms produced by the Application of Cold to the Sciatic Nerve. (Arch. Gén. de Méd., 5th series, vol. xx, p. 346, 1862.)

Eulenburg, Lehrbuch der Functionzellen Nervenkrankheiten, Berlin, 1871.

Weir Mitchell, Injuries of Nerves and their Consequences, Philadelphia, 1872.

* Edwards, Brown-Séquard and Tholozan, and Vulpian have shown that when the hand is plunged into cold water the temperature of the other hand is lowered or elevated. Brown-Sequard has, moreover, remarked that the reflex phenomena determined by local applications of cold to the skin are produced in a point symmetrical to that where the local application was made. Dumontpallier has quite recently insisted upon the study of the localization of the æsthesiogenous parts of the skin. Edwards, De l'Influence des Agents Physiques sur la Vie, Paris, 1824. Brown-Séquard and Tholozan, Recherches Experimentales sur quelques uns des Effets du Froid. (Arch. Gén. de Méd., 5th series, vol. xii., p. 683, 1858.) Dumontpallier, Leçons sur les Actions Reflexes. (Un. Med., 1880.)

rapidity proportioned to the duration of the exposure to the action of the cold. To this period succeeds another assemblage of symptoms to which has been given the name of reaction, a reaction which is characterized by manifestations of an opposite kind. The skin becomes red, animal heat is raised, the secretions augment, the muscular functions acquire a new energy, and a quite special sensation of *bien être* is experienced. It is in this double action on the nervous system that we must seek an explanation of the effects of hydrotherapy, whether considered as an antipyretic, a nerve tonic, or simply as a means of hygiene.

I will leave at one side for the present the antipyretic effects of cold water, to which I shall return when I shall speak of the treatment of fever by cold baths, and I shall at the present time limit myself to the effort to set clearly before you the results which may be obtained in nervous diseases from the double physiological action above mentioned.

Action on the Nervous System.—In order that the functions of the nervous system may be accomplished in a regular manner, there must be not only complete integrity of all the constituent parts of that system, but it must receive a uniform and sufficient supply of normal arterial blood. When one of these conditions is at fault, immediately modifications, more or less profound, in the nervous system result. This first fact being posited, we may immediately deduce consequences of the most positive kind from the stand-point of hydrotherapy, which acts on the nervous system, on the circulation, and on the nutrition.

On the nervous system by the sudden perturbation which it causes in the functioning of the sensory and motor nerve apparatus, hydrotherapy re-establishes the regular operation of the cerebro-spinal axis; it, moreover, brings into exercise the vaso-motor centers, and thus produces an equilibrium between the functions of the brain and spine on the one hand, and the great sympathetic on the other. Moreover, it attenuates the exclusive action of certain local affections, which by reason of reflex influences become the point of departure of important secondary perturbations of the brain and spine.

By its action on the circulation, which it regulates and renders active, hydrotherapy still further modifies in a happy manner the functions of the brain and spine. Finally, by its general effects on nutrition,* by its direct or indirect action on the vaso-constrictors and vaso-dilators, on the secretory nerves, and lastly on the trophic nerves, cold water stimulates nutrition, promotes the regular play of the different organs, and becomes one of the most active agents of tonic and reconstituent medication. Under its influence the globules become richer in hæmoglobin, the oxygenation of the blood more active; and we ought to make a capital point of this fact in the treatment of diseases of the nervous system.

Such is the veritable effect of hydrotherapeutics in nervous affections. I know that there has been much discussion as to whether the action of cold water were sedative, excitant, or perturbing. Some, with Trousseau, have pretended that cold water is the best of sedatives; others, as Fleury, have affirmed its excitant action; others, with Bloch, its perturbing action. These are, I opine, trivial questions, for according as you consider the effects of cold water during its application, or after its application, you observe opposite symptoms, and that it may be at one time perturbing, at another excitant or sedative.

Modes of Application.—It is not enough to know the physiological or therapeutical effects of cold water, you must understand the conditions to be fulfilled in order to obtain the most favorable effects.

* Kund has experimented on the influence of cold in cases of poisoning by strychnia. Frogs poisoned by this medicament, he placed, some in water at 34° C., others in very cold water. The muscles of the former very speedily returned to their state of physiological relaxation, those of the latter, exposed to a low temperature, kept their tetanoid state a long time. The same experiments have been repeated in cats with like results. (Kund, Gaz. Med., 1857.)

I am, then, going to enter somewhat into details which I believe are of importance, for we have seen physicians prescribe hydrotherapy without insisting either on the mode of application, or on the duration of the douche, or on the temperature of the water. It is necessary, on the contrary, that you should carefully determine all these points in your directions, and that you should not leave, as is often done, to persons who are strangers to the healing art, the management of the hydrotherapeutic treatment.

The means of application of cold water are numerous; these may be arranged in three distinct groups: In the one the water is delivered under high pressure; in the second, there is no pressure; in the third, the applications are made to the naked body by means of cloths or sponges. I shall then speak of three modes of application—douches, baths, and lotions.

Douches.—Douches are by far the most employed. They are divided into a number of varieties, which depend on the apparatus by which they are administered. We have, then, the *douche en pluie*, or shower bath; the *douche à colonne*, in which a column of water is let fall upon the body; the *douche à lame concentrique*, in which three or more concentric streams are directed on some portion of the body surface; the *douche en nappe*, in which the water comes in sheets; the *douche en cercle*, in which a circle of jets plays upon the patient; the *douche en jet mobile*, in which a varying direction is given to the jets. I need not occupy much of your time with a consideration of these douches; you are familiar with them all. In the shower bath the douche is applied by means of a large globe sprinkler (*pomme d'arrosoir*); in the *douche à colonne* the water descends with some force by a circular opening; in the third variety the globe sprinkler, instead of being pierced with a multitude of holes, has several circular chinks through which the water pours; in the *douche en nappe* the watering globe has the form of a bell; in the *jet mobile* a tube of leather or caoutchouc enables one to give a varying direction to the stream. The most used of these douches are the *douche en pluie* and the *mobile jet* douche.

In general, the stronger the pressure of the water, the less painful the sensation of cold. At the same time care is needed in the management of the pressure, which, when too violent, produces painful traumatisms. In the shower bath the douche strikes more especially the upper part of the body, and you ought to avoid, save in exceptional cases, douching the head. As for the *douches en jet* (the jet sprays), you can make use of different attachments which modify the form of the jet, and give the full jet or the broken jet, which may be directed, according to circumstances, on different parts of the body.

It remains for me to say what should be the temperature of the water, what ought to be the duration of the douche, what preparation the patient should make before, what he should do after the douche.

As far as the temperature is concerned, the douche may be cold, it may be tempered, or it may be alternately cold and warm. The colder the douche the more intense the reaction, the more painful, too, the application of the douche. So in very susceptible subjects and those who experience under the influence of cold a painful sensation of cardiac constriction and of suffocation, it is better to have recourse to tempered douches. In administering these douches a jet of cold water and a jet of hot water are turned by means of stop-cocks into the douche apparatus, and you can at your pleasure vary the temperature of the douche. Ordinarily at the commencement of the douche the water is tempered to 25° C. (77° F.), and is lowered during the douche so that finally it is not more than 10° C., or 15° C., (50° F. to 59° F.).

In the douches alternately hot and cold a much more active physiological reaction is obtained. In the so-called "Scotch douche" you begin with a

douche of the temperature of 30° C. (86° F.), and gradually raise the temperature to 50° C. (122° F., which is about as hot as can be borne), then you give immediately a douche about as cold as ice. There is another kind of alternating douche in which a succession of warm and cold douches is given to the patient.

Duration of the Douche.—The douche ought always to be exceedingly short. You have just been told that the favorable results of hydrotherapeutics are due to a double action on the nervous system; to obtain this double action the impression of cold must be of short duration. As a general rule its duration should not exceed thirty seconds, and the first application of cold douches ought not to exceed ten or fifteen seconds.

Preparation for the Douche.—There are certain rules which should govern the patient before, during, and after the douche. The greater the difference between the temperature of the body before the douche and that of the water, the more active the reaction will be. It has therefore been advised to cause the patient to take vigorous muscular exercise before the douche, in order to induce some degree of sweating. In our great gymnastic establishments, where the happy idea of douche compartments for the public benefit finds realization, it is at the moment of greatest muscular activity that the douche is taken.

This important condition, to have the skin in a state of perspiration, in order to derive from cold douches all their desirable effects, is little known, not only to the public, but also to physicians. Does not everybody, in fact, maintain that a cold bath taken when one is sweating is a bad thing, and that it is to this cause are due the evil effects which sometimes follow the free external use of cold water? I believe this to be a complete mistake; and if we occasionally see congestions of the lungs follow a cold plunge, it is more probable that the individual was chilled before the bath was taken, than that the pulmonary congestion resulted from the bath

Elsewhere we see, as a medicinal measure, a disposition manifested to favor as much as possible this state of sudation by exercise and artificial means. As artificial means, in Germany they make great use of the dry blanket, the patient being enveloped in several blankets thoroughly tucked around him, and kept in the hot, dry, sweating room, or subjected to a powerful vapor bath till a state of free perspiration is induced; then the wrappings are removed and a cold douche is administered, or he is immersed in a bath of cold water. The Russian bath, so much in use among a great many nations, and of which we possess in Paris a very complete establishment, the Hamman, is based entirely on this double action of heat and of cold water.

During the douche the patient ought, as Beni Barde recommends, to suppress, as much as possible, strong contractions of the muscles, and keep a firm hold of the bar for support. The respiratory distress is mitigated by freedom in outcries. In the event of congestive tendencies to the head or to the uterus, it is well to take a warm foot-bath, or douche the lower extremities with warm water after the cold douche.

Immersions.—When remedial effects are sought from immersions, the patient either takes a single plunge into cold water, which should be of sufficient depth that the whole body may be immersed, then immediately rubs himself dry till the skin glows, or he remains several minutes in the bath; the latter course is recommended when an antipyretic effect is desired.

Partial baths are often beneficial, such as foot-baths, sitz-baths; those with running water, furnished with implements for local douching, are preferable.

Affusions and Packing in the Wet Sheet.—Affusions consist in pouring cold water on the naked body of the patient, or in what is called the wet pack. Wrapping the patient in wet blankets is a very active hydrotherapeutic method. It has this advantage, that it may be employed in all places, and without having recourse

to the quite complex apparatuses just described. It is, however, a painful application, and is by no means free from danger. The mode of procedure is simple enough: You wrap the patient in a sheet that has been wrung out of icy-cold water —you may apply the wet sheet with the patient standing or lying, and keep him thus enveloped ten to fifteen seconds— then with brisk rubbing with dry cloths you try to promote vigorous reaction. This envelopment may be partial; in this case it has been advised to leave the wrappings on during the entire period of reaction.

Such are in general the methods of application of cold water. There are other modes of using cold from a therapeutic point of view, and I shall speak of applications of ice and pulverizations of ether. It has been advised to treat certain neuroses by the application of ice the whole length of the vertebral column, and in England chorea is much treated by this method, and so in hysteria. Charcot has even attempted this method at the Salpêtrière, the ice being placed for the space of a half hour, then an hour, over the ovarian region in hysterical patients. By this means he has observed a diminution in the number and intensity of the attacks. A physician of Varsovie, Lublesky, has advised another means of producing refrigeration—the application of ether spray the whole length of the spinal column. He has thus treated chorea.

HOUSE DRAINAGE.—Dr. W. J. Naismith, of Ayre, Scotland, summarizes certain leading points bearing on this subject in the following:

"The main drain of a house should be disconnected from the sewer, and should in addition be provided with a well-ventilated trap outside the house. The trap should be ventilated by a pipe at least three inches in diameter, and carried up the outer wall with as few angles in its course as possible, opening at a point well above the eaves of the house. A trap alone in this connection is not to be depended upon, for it has been found over and over again that without the employment of a disconnecting chamber there exists no safeguard against the entrance of sewer gas through the main drain. Again, all taps (of which the siphon or S form seems to be the most effective—and the more rapid its bend the better) should be provided with ventilating pipes, which should not be led into rain-water pipes, but carried up independently, with, as already stated, a diameter of not less than three inches, to the roof of the house; for it must be remembered there are few traps whose power of resistance exceeds that of a column of water an inch and a half in depth; so that if the extra pressure of sewer gas be not relieved by a ventilating pipe, it will force the trap and gain admission in spite of it. Further, there must be no connection whatever between what may be called the minor pipes of a house, such as those from baths, lavatories, sinks, sculleries, etc., with any drain or soil pipe. They should, being siphon-trapped in order to exclude cold air, be carried to the outside of the house and made to discharge in the open, about two feet from the ground, on to trapped gratings communicating with the house drains. Lastly, a drain should not, if the plan can be possibly avoided, traverse the basement of a house, but in any case should be so constructed with 'glazed earthenware socket-pipes, efficiently laid and jointed,' as to insure as far as possible immunity from any escape of its contents. For the sake of any one who may be curious to know what sewer gas is composed of, it may be well to state that it contains carbonic acid, nitrogen, sulphuretted hydrogen, light carburetted hydrogen, and ammonium sulphide. Cess-pools should, as a rule, never be employed when access can be got to a main sewer; but in respect to detached or country houses they are an unavoidable necessity. In their construction it is necessary for safety to remember four things:

"1. They should be built as far away from the house as possible.

"2. They should never be placed near a well, which might thus become impregnated with the products of decomposition.

"3. They should be constructed with brick laid in cement, so as to insure their being water-tight; and

"4. They should be well ventilated, to prevent the collection of foul gases emanating from their contents.

"Let the great fundamental fact never be lost sight of, that the air we breathe, the water we drink, and, it must be added, the milk with which our dairies supply us, are three great channels whereby septic or poisonous infection is conveyed to the human system; and it needs not to dilate on the grave issue involved upon these highways being jealously guarded and maintained absolutely above suspicion."

SERIOUS WOUNDS THAT FAIL TO KILL.—A short time ago a shoemaker of Astoria, N. Y., shot himself twice with a heavy pistol, once in the ear and once in the mouth. He was brought to the Roosevelt Hospital, in this city, where it was discovered that the first ball glanced from the skull. The other is thought to be somewhere in the head, perhaps in the brain. Speedy death was expected; but the next day the patient walked away from the hospital, saying that he was sorry for the attempt on his life, but appeared to be in no immediate danger of dying.

With this case as a text, a writer in a morning paper reviews a large number of more or less marvelous cases of recovery from grievous hurts, showing that serious injuries to the main organs of the body are not always followed by death. Men persist in living, not only with bullets in their brain, holes in their stomach, dislocated vertebræ, and wounds in the heart, but even with open wounds clear through the body. During the civil war, General H. A. Barnum, of Brooklyn, received in battle a wound which still remains an open passage through the body. For years the treatment of this wound has been simply to wear in it a roll of prepared lint, which is renewed daily. The suppuration of the wound is constant though variable.

General Shields, of Missouri, had a similar wound extending through his body, and open in front and behind. His wound, it is said, was received in the Mexican war, and he wore, not lint, but a silk handkerchief in it. This he could draw directly through his body.—*Scientific American.*

[After reading this the reader will no longer wonder at the audacity of some surgeons who think that President Garfield's death was as much due to the treatment he received as to his wound.]

ROMANCE OF THE WINE-PRESS.—A correspondent of the London *Argosy* has had his romantic ideal of the wine-press rudely shocked by some continental scenes of wine-making. He says:

"I had had dim ideas of snowy garments dyed purple with the juice of grapes, and the delicate feet of girls treading the luscious fruit under the shade of vine-clad trellises in the open air. In my imagination there were fountains of pure water washing away all stains and impurities, and long processions of men and maidens bearing the fruit on their heads, all decked with flowers, and singing and dancing to the sound of harps and flutes. Had I not seen pictures to that effect, read poetical descriptions of it, and had I not always been encouraged by my childhood's instructors in this delusion? And now, behold, there were not any snowy garments at all; the Hungarians had on coarse shirts and loose drawers tucked above the knee, and I came to the conclusion that they had never seen any fountains of pure water, and wouldn't have known the use of them if they had. For there was a kind of grimness about them, burned in by the sun, which seemed to indicate that they never washed either themselves or their clothes. In fact, they had a fine contempt for the ordinary rules of cleanliness. One black-

eyed, purple-legged fellow, with the grape-juice just drying on his bare feet, seized a basket, and ran off down the steps and into the vineyard, and presently returning with a load of the fruit, shot it into the press, and, with all the dust and dirt of the road still clinging to his feet, mounted, and began to tread the grapes, and soon stood almost knee-deep in the liquor, which, having served him as a sort of foot-bath, was to be the drink, perhaps, of future generations of refined, fastidious palates. Having seen this I became melancholy, and preferred to leave the rest of the manipulations of earth's choicest nectar in obscurity."

NOTES IN SCIENCE AND AGRICULTURE.

The Fate of Dazzling Inventions.—The following shrewd comments are furnished by our contemporary *The Manufacturer and Builder:* "It is curious to note the decadence of inventions and discoveries which at first dazzled the world by their startling novelty and apparent wealth of power. Shortly after the successful experiment of the Montgolfier brothers, the dream of the world centered on aerial navigation, and up to fifty years ago nothing mechanical so attracted public attention as a new balloon. To-day the balloon is ranked as an important side-show to a country circus, and in times of war as a possible observatory for men whose lives no sensible corporation would insure. It is also useful in the nursery and lecture-room, and occasionally, when fools are unusually plenty, furnishes an excellent item for the press. Beyond this it is of no practical or scientific value. It has possibilities, but they seem to develop with most excessive deliberation.

"Chloral hydrate was another meteor-like discovery. At first regarded only as a curious product of alcoholic agitation with chlorine, it was for some time shelved. But when Liebreich brought it forward in April, 1869, as a perfectly safe hypnotic and anodyne, its use sprang up like wild-fire, and its consumption increased with such rapidity that in 1871 an actual choral panic occurred, the laboratories not being equal to the demand. Then a startling number of sudden deaths were found to have occurred while patients were sweetly sleeping under the influence of the 'safe' hypnotic, and investigation showed that the effect of chloral was the anæsthesia of chloroform, and very far from being safe. Thence its popularity waned, but not, however, until it had enslaved tens of thousands hopelessly to its constant use, and done an incalculable quantity of mischief.

"Nitrite of amyl caused another furor in the medical world. It was claimed to be an absolute specific in hydrophobia and strychnia poisoning, and an antidote for the bite of the cobra. For all three of these it is now considered useless, although acknowledged to be of considerable value in angina pectoris, asthma, and other maladies of a paroxysmal nature.

"Still later on the list comes the phonograph, which for a few months probably drew more attention than any one combined discovery and invention in the world, and for which the most brilliant promises of usefulness were made by the inventor and his admirers. It is now relegated to the dime museum and the cabinet of scientific curiosities—more useless to man than one of Crooke's radiometers lazily whirling in an optician's window.

"In fine, it seems almost inevitable, that those discoveries which attain wide celebrity in a short time are doomed to return to obscurity, while those which have proved to be of the greatest benefit to man—the press, steam engine, telegraph, photograph, and loom—have been of slow growth, have been hampered in their infancy by cavil, skepticism, and even persecution, and have been almost reluctantly accepted even after their value was proved. There has been but one exception to this rule—the telephone."

Dust, Mist, and Clouds.—Mr. Aitken draws the following conclusions from an extensive series of experiments: "Whenever vapor condenses in the atmosphere, the condensation is always made on a solid nucleus, which is furnished by particles of dust. Without dust there would be neither mists nor clouds, and the super-saturated air would transform every object upon the earth's surface into a condenser upon which it would deposit its excess of water. Whenever the breath becomes visible in a cold atmosphere it demonstrates the impure and dusty condition of the air. The foam of the sea, meteoric matter, and fires are fertile sources of the dust and impurity."—*Les Mondes.*

Early Peas.—A writer thus advises on this subject in the *American Agriculturist:* "There are two distinct classes of peas: those with small round seeds, the others with much larger, irregularly-shaped peas, the surface of which is wrinkled. The wrinkled, seeded, or marrow peas are as much better than the other as sweet corn is superior to field corn. The round peas, while not so good, are much hardier and earlier than the others. Unless the soil is warm, and they germinate quickly, wrinkled peas will decay before they can come up. The round peas are vastly better than no peas, however, and are acceptable to most of us. To have early peas,

they must be sown early—the earlier the better. After the soil has thawed for the first four inches, even if it is solid below, sow peas. If the ground was manured and plowed last autumn, all the better; if not, select the richest available spot, and open a drill four inches deep. Peas should be covered deeper than most other seeds. For varieties, the Early Kent is one of the best; it has almost as many names as there are dealers. Daniel O'Rourke is one of the names of a good strain of this pea. Carter's First Crop is another good variety, and every spring new extra early sorts are sent from England, which usually turn out to be the old Early Kent with a new name. The peas should be sown in the bottom of the drill rather thickly, at least one every inch, and at first covered with about an inch of soil. It is well to put about four inches of coarse stable manure over the rows; this is to be left on in cold days, but when it is sunny and warm, pull it off with the rake, and let the sun strike the soil over the peas, replacing it at night. When the peas sprout, gradually cover them with fine warm soil, placing the coarse manure over them as needed, until the covering of soil reaches the level of the surface. If a ridge of soil a few inches higher than the peas be drawn up on each side of the row, it will greatly protect them from the cold winds. When the plants are a few inches high, draw some fine soil up to them, and stick in the brush. When the soil becomes dry and warm, the main crop of wrinkled peas may be sown."

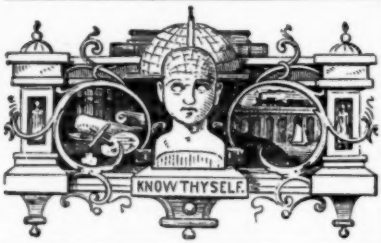
The Frost that Killed the Peaches.—"There will be no peaches this year, by the way. Frost killed them all. Every last solitary peach," the man on the wood-box remarked, with a pathetic inflection in his voice. "Which frost?" savagely demanded the fat passenger. "Same old frost," replied the man on the wood-box, sadly. "Same frost that killed 'em last year, I suppose?" said the cross passenger. "The same!" the man on the wood-box asserted. "And the one before that again?" the brakeman echoed. And the man on the wood-box bowed his head in assent. "The same old frost," he said, "that kills all the apples in Michigan every year, and destroys the ice crop on the Hudson. I've been a farmer myself, before I reformed, and I've known a snow-storm in Colorado to blight all the sugar maples in Vermont!"—*Burlington Hawkeye.*

Calming Effect of Oil upon Water.—M. Virlet d'Aoust, in a recent communication made to the Academy of Sciences of Paris, confirms, as a result of his own researches, the opinion entertained by various ancient authors as to the efficiency of oil in calming the surface of agitated waters. This effect was clearly noticed along the tempestuous coast of Samothrace, where the calming device is still practiced by some of the Greek sailors. At a distance of about a mile from the shore-line, the oil is spread before the vessel, which now almost immediately enters upon smooth water. With the gradual spread of the oil, there is an equally gradual planing down of the water's surface, until over a very considerable extent it assumes the singularly smooth configuration of the colloquially-termed "sea of oil." Similar experiments repeated on the open sea are stated to have been invariably followed by the same results, the waves flattening out over a circular area proportional to the quantity of oil distributed. The stability observed in the waters of the Bay of Coatzacoalu, even during the prevalence of the violent "*norte*," and while the sea outside is greatly agitated, is ascribed to the quantity of petroleum that is carried down and thrown into the bay by the river of the same name. It would be interesting as stated by M. Virlet d'Aoust, to determine whether a similar effect is produced upon the waters of the Dead, Azov, and Black Seas by a certain quantity of mineral oil.

Use of Coal Ashes.—We have before alluded to the good effect of coal ashes on some soils—but the matter is worthy of being kept before the public. A writer in the *Country Gentleman* thus advises:

"It is the common opinion that coal ashes are of little or no value. This is an error. I have heretofore stated some of the benefits derived from their use. They have likewise been employed for years by my neighbors, who hold them in high estimation. Their benefit is of a two-fold nature—they favor moisture, and improve the texture of the soil. They serve admirably as a mulch, either on the surface or mixed with the surface soil, the latter being the best. As the supply is not sufficient for general farm purposes, they are used in gardens, around shrubs and trees, and particularly for potatoes, which largely require moisture. Mixed with the surface soil, and occasionally stirred, they have an excellent effect upon trees and shrubs, keeping up an uninterrupted growth during a drouth, if the application is liberal and well worked in.

"Where used in a garden, the earlier they are applied the better. The ground having been previously worked, spread evenly about an inch thick, and mix thoroughly with a few inches of soil. Where the soil is quite heavy more ashes should be used and worked in proportionally deeper, answering both as mulch and as soil to grow the plant; in the other case, where the soil is good, principally as a mulch. The effect will not be visible before the season is somewhat advanced. After that it will show, its best work being done in hot, dry weather. The effect will last several years, depending upon how much is used. Yearly applications may be made with benefit; and the experience here is that if liberal applications are made annually, and thoroughly mixed with the soil, no manure is required. This, I know, has a doubtful look, but observation has constrained me to accept it.



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PANICS—THEIR PREVENTION.

IN a school not long ago an alarm of fire threw the children into a panic which resulted in the death of a considerable number before order could be restored. On the Brooklyn Bridge the mere incident of a woman's stumbling while descending a stair-way produced a rush of men and women in frenzied excitement, many of whom were knocked down and crushed to death. In both cases the same cause operated: it was the sudden awakening of the instinct of fear in the minds of the weak and immature children and in the minds of those grown-up Bridge passengers. Fear predominated in their emotions and governed their actions to the exclusion of every other faculty. We may excuse the children for their headlong behavior, but when we consider that struggling, heaving, maddened crowd of well-dressed adults on the narrow foot-way between New York and Brooklyn, what are we to say in palliation of their conduct? A promiscuous multitude is fitful, changeable, and panicky. Especially is this the case where the situation has its suggestions of danger, as on a steamboat, in a theater or hall, or a railway car. A cry of fire will at such times be likely to produce a thrill of terror, and a sudden rush of the throng in the direction of supposed safety. There may be persons of courage and self-poise in such a multitude—there usually are—but they are borne away in the press and struggle and overpowered for a time at least.

Emerson says "fear always proceeds from ignorance," and he is in great part right, for let a man be well acquainted with the construction of a theater, for instance, knowing its several means of exit in front and rear, and the means at the command of the management to provide for the safety of an audience, if he happen to be present when a panic seizes the gathering for any cause, he will be likely to control himself and get safely out of the building. The engineers and firemen of an ocean steamer rarely lose their balance in a time of peril; so too the trained firemen of a city are cool and vigilant in the midst of scenes which would appal nineteen out of twenty men unused to them.

Temperament has much to do with being affected by fear to the extent of panic, but lack of self-culture and of the poise and consistency of faculty which result from thorough self-culture, have more to do with it. Nature is generally liberal in her endowment of the child with the organ of Cautiousness, and it is one of the most active influences of his mind; but as the intellect develops, and under proper training the sentiments of kindness, courtesy, respect, confidence, friendship, and affection become important factors in mental operations, the impressions of Cautiousness are modified, and if the balance of organization be quite complete, its influence becomes that

of prudence and circumspection, which will be calmly exercised even in a sudden emergency. The calm, discreet man will not rush with the crowd; but rather keep apart from it, and endeavor deliberately to obtain a true sense of the condition of things. Such a man was he who remained in his place in the burning theater while nearly all the rest of the large assembly were pushing and crowding toward the doors, and yet was one of the first to make his escape from the building. When asked how he could be so cool at such a time he replied: "I did not look at the fire or the frightened crowd, but shut my eyes for a moment and thought upon what I should do, and having made up my mind I opened my eyes and did it."

They who are subject to impressions of fear should avoid crowds and cultivate those elements of manliness and womanliness which contribute to steadfastness and calmness. Let the intellect be brought into such active operation that its rational influence will be promptly exerted at all times. Let the higher sentiments of faith, veneration, and integrity be strengthened by a consistent, upright life. Nervous trepidation in the hour of danger, with its accompaniments of confusion and dismay, is exhibited by people whose life is superficial, vain and perverting. There is nothing which will keep a man calm and even-toned in the midst of danger more surely than the consciousness of a true, unselfish life. To one whose spiritual sense is enlarged by a life of earnest trust in the King immortal and invisible, the assurance of the psalmist, "He shall never be moved whose mind is stayed on Thee," has a certain, decisive meaning, and he can be calm and patient when others are confounded.

TRUE OR NOT?

OUR attention has been called to a paragraph in a New York weekly, in which a weak effort is made to be sarcastic over a brief phrenological opinion which had been published in connection with an obituary notice of one of New York's best men. A simple statement was made of what the organization clearly indicated to any experienced phrenological observer. The fact that the life and character of the man, as known in the community, corresponded with the scientific inference was fairly the property of the phrenologist, and the candid reader, we think, would not except to its use by him.

If what was said had been shown to be untrue, then our critic would have done the readers of his paper some service, and his application of the spur of witticism would stimulate to more care in future predications.

A mineralogist describes a stone as a bit of crystallized carbon, with such and such properties of refraction and hardness. Another man who deals in gems is shown the stone and exclaims, "Pshaw, it's a diamond!" Would a sneering ejaculation of this sort in any way depreciate the merit of the scientific description, or affect the reputation of the mineralogist?

The New York *Tribune* of April 28th published the following:

"A trifle more than twenty years ago a lecturer on Phrenology, speaking of the bumps of prominent Federal and Confederate generals, gave the following estimate of the present Widow-Governor of Massachusetts: 'Butler has a large brain, but not of the largest size. His head is long and wide rather than high. Judgment, tact, energy, and social attach-

ment are his leading characteristics. He is bold almost to recklessness. His safety and success are due to his skill, tact, and knowledge, instead of moral prudence. He is for his cause or party at all hazards. Moral claims do not control, although they influence him considerably. He can be trusted when committed to the right, but needs more elevation of brain to gravitate uniformly to the side of justice and morals, and soar above selfish and partisan considerations. He needs more height of head as the leader of a moral cause, or for judge, governor, statesman, or President.'"

Perhaps this is more to the liking of our weekly contemporary! The phrenological opinion having been uttered so long ago, he can digest at his leisure its application to the political, professional, and home life of the distinguished subject.

A REMNANT OF THE "INQUISITION" IN THE ENGLISH ARMY.—The *Pall Mall Gazette* is responsible for the following statement, which, if true, suggests that our cousins over the sea haven't yet quite emerged from mediæval barbarism. "The War Office has published its substitute for flogging, and the persons who were attached to that penalty when inflicted on others will probably find much satisfaction in studying the component parts of its successor. It consists of field imprisonment No. 1 and field imprisonment No. 2. It may suffice to describe field imprisonment No. 1. Under this form of punishment, the offending soldier may be kept three months tied up in straps, ropes, handcuffs, fetters, or both handcuffs and fetters. During that period, he may for twenty-one days, with a day's interval every three days, be fastened, in addition to his other fastenings, to a "fixed object," so that he can not move, for two hours a day. While this is going on, he may further be dealt with as if he had been an ordinary criminal under sentence of three months' imprisonment with hard labor. The ingenious Torquemada of the War Office who has devoted his leisure and his gifts to this subject may be congratulated on the skill with which he has accumulated horrors on horror's head.

PHRENOLOGY AS A STUDY.

IN this age of scientific inquiry, there is a demand for information in regard to mind and its laws of action; anything which promises to reveal character and give men a knowledge of their fellowmen, seems to most people very desirable. The world is full of singular sayings with reference to disposition; if a tenth part of them were written out, the list would be astonishing. Among them are these: Long fingers indicate the desire for gain; a little finger much too short indicates submission, but if the third finger be as long as the middle finger, or nearly so, the woman having it will try to rule. In the days of our childhood, white spots on the nails were considered evidences of lying. People ask what is the meaning of straight eyebrows, arched eyebrows, a straight nose, Roman nose, or a "celestial" nose; and most people fix some meaning to each of these. One asks, what is the meaning of a short upper lip, or a long upper lip; of a large mouth, or a small mouth; the dimple on the chin, the turning-out of the toes, or the turning-in of the toes. All of these things show that people desire to know what others are in character, and they look for signs of faculty and

disposition in the physical make-up. The way these signs get currency may be, that a person sees one with a peculiarity of hand or foot, of walk or expression of face, and because he has a special or peculiar trait of character, the peculiarity of form or motion becomes associated with the trait of character; and it comes to be regarded as a sign that everybody who walks with the toes turned in, or has a straight or crooked mouth, will have the same trait of character.

Within the last hundred years, and especially within the last fifty years, the brain has come to be regarded as the center and source of all power in men; and those who study mind through organization, are devoted to the consideration of the brain, and of its developments in different parts, as the cause and basis of the different types of mental action. By a long series of observations from the beginning of Dr. Gall's studies in this direction, it is found that a broad, heavy base of brain, as we see it in carnivorous and cruel animals, is a sign of force and executiveness in men and women; that an ample development of brain across the lower region of the forehead belongs to those who are quick and clear in observation and practical in talent; while massiveness of the upper part of the forehead is found with those who are profound in thought and broad in their ideas; that those who are amply developed in the top-head are moral; those who have a high crown of head are proud, ambitious, dignified, determined, and self-reliant; those who are full in the back-head are social; those whose back-head is flat and straight and short, are not social, as a rule.

Character can be studied in this way by the bare skull alone, the face being entirely absent. The phrenologist has little doubt regarding the outline of the character of the person who once carried the skull. This being the true basis of character-reading, its importance can not be over-estimated. Those who wish to be teachers, preachers, lawyers, merchants, or who have to negotiate business with different people, as well as those who desire to become practical phrenologists, may become instructed in all that is known of Phrenology, by attending a course of lectures in the American Institute of Phrenology, which holds its annual sessions in New York, beginning the first Tuesday in October; full explanations of the course of study and the topics taught will be sent by mail, on application, from the office of THE PHRENOLOGICAL JOURNAL.

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To Our Correspondents.

QUESTIONS OF "GENERAL INTEREST" ONLY *will be answered in this department. But one question at a time, and that clearly stated, must be propounded, if a correspondent shall expect us to give him the benefit of an early consideration.*

IF AN INQUIRY FAIL TO RECEIVE ATTENTION *within two months, the correspondent should repeat it; if not then published, the inquirer may conclude that an answer is withheld, for good reasons, by the editor.*

TO OUR CONTRIBUTORS.—It will greatly *aid the editor, and facilitate the work of the printer, if our contributors generally should observe the following rules when writing articles or communications intended for publication:*

1. *Write on one side of the sheet only. It is often necessary to cut the page into "takes" for compositors, and this can not be done when both sides are written upon.*

2. *Write clearly and distinctly, being particularly careful in the matter of proper names and quotations.*

3. *Don't write in a small hand, or in pencil, as the*

compositor has to read it across his case, a distance of nearly two feet, and the editor often wants to make changes and additions.

4. Never roll your manuscript or paste the sheets together. Sheets about "Commercial note" size are the most satisfactory to editor and compositor.

5. Be brief. People don't like to read long stories. A two-column article is read by four times as many people as one of double that length.

6. Always write your full name and address plainly at the end of your letter. If you use a pseudonym or initials, write your full name and address below it.

WE CAN NOT UNDERTAKE TO RETURN UNavailable contributions unless the necessary postage is provided by the writers. IN ALL CASES, persons who communicate with us through the post-office should, if they expect a reply, inclose the return postage, or what is better, a prepaid envelope, with their full address. Personal matters will be considered by the editor if this is done. Anonymous letters will not be considered.

MINERAL WATERS.—*Question:* Is water highly charged with carbonic acid gas, and holding in solution oxide of iron or other mineral matter, but free from organic impurities, wholesome for household uses?

Answer: The combination of carbonic acid with oxide of iron produces carbonate of iron, which is a common mineral in water, and unless the quantity is unusually large, the water is not seriously affected as a beverage. In iron districts, the springs are more or less charged with sulphate or carbonate of iron; the sulphate is frequently found in them and in the streams flowing from them; yet the water, unless the sulphurous element be so strong as to affect the taste, is not regarded unhealthful. All natural waters contain mineral matter in solution, lime and soda being usually present; and it is only when the quantity becomes excessive that such earthy substances are injurious. It is not so much the mineral matter in water which produces trouble in the system, as it is improprieties of eating. To be sure, one can overdrink, surcharge the system with fluid, overwork the emunctories, especially the kidneys, whose function it is to dispose of the excess; but it is the improper solids taken into the stomach which mainly disturb digestion and the alimentive function. It is easier for people to form unhealthful habits in drink. The tendency to overdrink in warm weather is specially manifest, and then it is that highly charged carbonic water, especially that sold in the cities from fountains, in combination with flavorings more or less poisonous, are productive of decided harm.

SOUTH-WESTERN CATCH-WORDS.—*Question:* Can you give me the meaning of words like these which are in use on the south-western frontiers, viz.: "Rustlers," "Cow-boys," "Dinglers," "Notchers"? H.

Answer: According to an exchange, "Rustlers" are thieves who run off cattle from the ranches across the line into Mexico, and sell them there; then plunder the Mexicans with a sort of impartiality, and return to the United States. "Cow-boys" are those who earn their living by taking care of the herds; they are said to be orderly and quiet when engaged in their regular employment, but when off duty in the towns are disorderly, commit all sorts of cranks, and even outrages, as a matter of fun. "Dinglers" are stage robbers. "Notchers" are a desperate set of men, who wantonly take life for no other purpose, seemingly, than to obtain notoriety.

PREPARATIONS OF SKULLS OF ANIMALS.—R. H. L.—After removing the integuments from the skull, if you would place it where it would be accessible to ants, those little animals would soon deprive the bone of every vestige of fleshy matter. The quicker process is to expose the skull to the heat of a slow oven; but in this case it would be necessary to watch against carrying the roasting too far, as this would dry out the bone so much as to make it very brittle.

CONSCIENTIOUSNESS IN THE FACE.—H. L. F. G.—Physiognomists find two or three places in the facial features which bear a relation to conscientious perception, it being particularly indicated by perpendicular wrinkles between the eyebrows, its breadth and sensitiveness having a relation to the number of wrinkles there. A single wrinkle is thought to be a sign of scrupulosity in small matters; wrinkles on each side of that mentioned, show a disposition to require justice in others; holding one's self to a strict accountability has its sign in the appearance of wrinkles running outward from those last mentioned.

DOUBLE CROWN.—H. M. C.—You may refer to the double center of hair-growth which is sometimes seen—a curious occurrence, but having no significance. Or perhaps you refer to two cranial prominences on the head. The development of Conscientiousness may be so marked as to produce prominences on each side of the median line of the head; so, too, Approbativeness may be very largely developed, and have a similar effect. We have frequently seen this condition. We have known Hope to be remarkably expressed in this way, and Spirituality also. An illustration of the last case can be seen on the shelves of the Institute of Phrenology, in a cast taken from the head of a man who came into this office for the purpose of having his head examined.

WANTS THE AUTHOR.—M. C. B. wishes the author of the well-known motto, "He whom the gods would destroy, they first make mad." The motto is an old one, and the Latin reads, "*Quem Jupiter vult perdere, prius dementat.*" We think that the source of these

lines is in obscurity. It probably belongs to English literature of a century or more ago. Possibly a reader can supply its true origin.

What They Say.

Communications are invited on any topic of interest; the writer's personal views, and facts from his experience bearing on our subjects, being preferred.

A BAD COMBINATION.—After the closing exercises of the class at the Institute of Phrenology, about the middle of December, 1874, I went forth with the best wishes of Professors Wells, Sizer, etc., and determined to speak a good word for the science of Phrenology on all suitable occasions, and to set its grand and beautiful truths upon as high a plane as I could, trusting that, in time, I should acquire the practice and experience necessary to teach the most beneficial of all knowledge in its best light. Ten days later found me in the town of S——, in the State of M——, and in company with several persons, all of them strangers to me, I introduced myself, and the conversation naturally turned upon the merits of Phrenology. An intelligent-looking young man removed his hat, and asked for an examination. I found J—— D—— to be the possessor of several good qualities and a man of some ability, but what arrested my attention most was, his combination of small Acquisitiveness, Conscientiousness, moderate Self-esteem, and Caution; and in despite of his good qualities, I ejaculated, mentally, "Sneak thief!" By describing a good and then a bad trait in his character, in appropriate language, I managed to unfold and describe his weak points without giving offence, and gave him instructions how to cultivate and develop his weak faculties. The peculiar combination of these four faculties impressed me strongly. I could not dismiss him from my mind altogether, but kept trying to outline the possible results of these developments in combination with his large Ideality and other faculties; and upon my return home in the evening, my first remark was that I had examined one very peculiar head, and although I found Acquisitiveness small, etc., in it, I believed the man capable of almost any low, mean theft that other faculties might dictate or his wants require. This called forth the remark from a friend: "Could a person with small Acquisitiveness be positive enough in his love of property of any kind to be a thief?"

My reply was, the tendency arises from a negative rather than a positive quality of the faculty, which does not appreciate the true worth of property. He looks upon whatever he needs for his present wants as common stock; he does not have that sense of ownership that a better endowment of this faculty gives. He believes in having things in common; like the hungry chicken, he appropriates food wherever he finds it, to appease the gnawings of hunger. It may be grain out of his owner's or a neighbor's bin, which he eats until his wants are satisfied, and thinks not of future wants until again hungry. Should this man be in a country-store and be hungry, he will put apples, crackers, or any other eatables he can obtain unobserved, into his pocket. If the weather is cool and he needs them, he appropriates a pair of gloves or mittens for his comfort; and should his weak conscience remonstrate, it is smothered with the thought, "The world owes me a living!" Cautiousness being moderate, he will not be overguarded against detection; and Self-esteem being moderate, allows him to do things beneath the dignity of a man.

A week passed; and the weekly paper printed at S—— came to hand, and in the "Local Items" I read this paragraph:

"J—— D—— was arrested by a sheriff from Boston, for stealing a suit of clothes and ten dollars from a sick man with whom he was watching."

I afterward learned that he had the suit of clothes on at the time of my examination, which was but a few days after the theft, clearly showing his want of caution. That he had neither conscience or dignity, is evident from the fact of his taking the advantage of a helpless sick man.

I have often observed that a person with a fair amount of Acquisitiveness (other mental endowments being the same), will do better work and is more industrious, than one in whom it is small. The one will work for moderate wages rather than be idle, and will do better and more work—will do a more thorough job of any kind for the same amount of money. The other will not work unless he gets the very best of pay for what often proves to be shiftless, inefficient service. As mechanics the one is prudent and economical in the use of material, and a benefit to his employer; the other wastes and destroys more than his services are worth. One has both work and money; the other but little of either. The one wants every cent that is due him, and is generally ready to pay every cent he owes; the other, in the settlement of an account in which there is a discrepancy, says, "A few cents, or even a 'quarter,' either way, don't amount to much, anyhow—let's call it square." And, generally, it will be found that the same loose, careless want of appreciation of the worth or value of material, property, money, etc., characterizes their work and conduct through life.

J. S. HOLM.

"STOMACH FITS"—A MOTHER HARD TO CONVINCE.—[Extract from a letter written by a gentleman in Iowa, upon receipt of a copy

of Dr. Page's work, "How to Feed the Baby."] "In 1860 our fifth child, a girl, had a disease that was raging about here, but which none of our doctors could name. As about every patient treated by our physicians died, I, myself, ventured to do what I could by way of treatment. The first and second stages, as they might be termed, having passed, there came what can only be described as the 'blue stage.' The whole skin was so contracted that it seemed drawn with a great power over the frame. The entire body and limbs were pinched, and she looked like a bleached shirt soaked in water with too much bluing in it. The entire surface had a glassy, shining look. This was at the age of four months. She recovered; but when she was eight months old she began to have spasms, or what I am now convinced might be called 'stomach fits.' She would have as many as seven spasms a day. Having myself adopted the hygienic diet, and taking but two meals a day, I determined to try the two-meal system with this child. In a few days her spasms ceased, and for eight weeks she had not one. Being called away from home, my wife resumed the old habit, viz.: of feeding the baby at all times, or 'whenever she wanted,' and when I returned home (at the end of two weeks) the baby was having her regular spasms again. I again put her on two regular meals, and within a week all signs of spasms disappeared. Even then her mother was not convinced, but when I again had occasion to be absent, she fed the baby in the old way, and I let her have her own way. The child 'made a live of it,' but has never been well since. My oldest child at the age of twelve, of her own free will, adopted her father's regimen—a simple vegetarian diet—eschewing all spices (including salt), tea, coffee, pastry, etc., and for eighteen years has not known a day of sickness. It may be well to mention the fact, that we take as much care to have pure air as pure food, never having a 'closed house' during any portion of the year or of the twenty-four hours. Now, at thirty years of age, she (like myself at sixty) glories in perfect health and a simple diet. From thus much of my experience you will doubtless see that a book like the one I have just received was sure of a faithful and sympathetic reading. You have struck the right chord, and I believe that a general knowledge of the principles set forth in your 'How to Feed the Baby' would lessen the sicknesses of infants immeasurably, and probably reduce the mortality among them by one-half. One of our oldest physicians here, who first read my copy, and then sent for a copy for his own library, says: 'It contains more of value upon the subject of the proper care and treatment of infants and young children—indeed, I may say, as to home hygiene for the family—than can be learned in any or all of the medical colleges in the land! Its author is a benefactor of his race.'"

PERSONAL.

CARLOTTA, the ex-Empress of Mexico, is said to have recovered from her insanity. Her hair is entirely white. She spends much of her time in the study of music.

NATHAN ALLEN, M.D., of Lowell, Mass., has recently sent us a fine steel engraving of himself, executed by the Metropolitan Company, of Boston.

JOHN W. COLENSO, Bishop of Natal, died on the 20th of June last. He was born Jan. 24, 1814, and educated for the ministry, becoming Bishop of Natal, South Africa, in 1854. He obtained a world-wide reputation through the publication of a work in 1862, on "The Pentateuch and Book of Joshua." This work was condemned by the Convocation of Canterbury, and he declared to be deposed by the Metropolitan, the Bishop of Cape Town. The validity of his deposition, however, was denied in 1855 on an appeal to the Privy Council. Bishop Colenso published several works on algebra and arithmetic, some volumes of sermons, and "Ten Weeks in Natal" (1855), and "A Translation of the Epistle to the Romans" (1861).

LIEUT. SCHWATKA has undertaken an expedition for the exploration of the Chilcat and Yukon rivers in Alaska, more particularly of the latter. Except near the coast this great territory is quite unknown, but the geographical knowledge to be gained is apparently not so much the object of the trip as the discovery of the rich mineral deposits which have long been reported as existing in the interior. This is better than stumbling along among the ice-fields of the barren pole.

HENRY WARD BEECHER'S seventieth birthday was celebrated on Monday evening, June 25th, in a public manner at the Brooklyn Academy of Music. The call had been signed by clergymen and citizens, irrespective of denomination or agreement with the Plymouth pastor's theological views. The building was early crowded, and the street outside was thronged with those unable to gain admission. To those Mr. Beecher made a short speech from the stage entrance door.

WISDOM.

"Think truly, and thy thought
Shall be a fruitful seed."

AFFLICTION, like the iron-smith, shapes as it smites.

THERE is no crime so great as one perpetrated against the freedom of peoples.—MIRABEAU.

A MAN'S purposes, not what he has accomplished, are the true standard of his character. —D.

SOME people live without purpose, and they pass through the world like straws on a river—mere puppets in the tide.—D.

IT is needful that a man be true; not that he live. Are men dogs, that they must be happy? Luther dared to be undone.—PARKER.

Do right and fear no one; thou mayst be sure that, with all thy consideration for the world, thou wilt never satisfy the world.

"IMPROVE your opportunities," said Bonaparte to a school of young men; "every hour lost now is a chance of future misfortune."

GREAT souls are filled with love,
Great brows are calm;
Serene within their might, they soar above
The whirlwind and the storm.

THE highest education is that which not only provides food for the pupil's memory, but training for his judgment, discipline for his affections, guidance for his conduct, and objects for his faith.

ALL the great reforms of society have been based on faith. Often a single man begins and is derided, laughed at and almost overborne, yet, feeling right, he dares to go forward, and by and by triumph crowns the struggle.

MIRTH.

"A little nonsense now and then
Is relished by the wisest men."

A QUARRYMAN said he couldn't see any danger in smoking while he was handling powder. He can't see anything now.

"MA," he asked at dinner, "who was Charlotte Russe?" "Oh," said ma, "she was one of them old queens who made trouble during the Restoration."

TRAVELER: "Hi! conductor! Have you seen a man walking about with one eye, of the name of Walker?" Conductor (musingly)—"N-no, sir, I dunno as I have. What was the name of the other eye, sir?"

WITH a boil on the nose and a corn on the toe, a man has his afflictions carried to extremes. He has trouble at the head scenter and a bad movement on foot. He had better smell out the cause and toe the mark of propriety.

"I'M GOING to a masquerade ball this evening, and I want an appropriate dress," he said to the costumer. "What is your business?" "I'm a milkman." "Ah! then you'd better put on a pair of pumps and go disguised as a waterfall."

AN old colored man saw a sign in a drug store which read "Tasteless Medicines," and looking in he said: "Dat am de bes' advice I eber got—taste less medicines," and then hurried away just in time to escape a box of "anti-bilious."

A CRUSHED DEACON: "I hate to see a woman with rings in her ears," exclaimed the good deacon; "they hain't natural. If it was intended for woman to wear them she would have been born with holes in her ears. The first woman didn't wear earrings, I'll be bound!" "No," remarked the quaint little man in the corner, "nor nothing else." The discussion was brought to an abrupt termination.

Library.

In this department we give short reviews of such NEW BOOKS *as publishers see fit to send us. In these reviews we seek to treat author and publisher satisfactorily and justly, and also to furnish our readers with such information as shall enable them to form an opinion of the desirability of any particular volume for personal use. It is our wish to notice the better class of books issuing from the press, and we invite publishers to favor us with their recent publications, especially those related in any way to mental and physiological science. We can usually supply any of those noticed.*

FOR FAMILY WORSHIP. Part 1.—Scripture Readings. Part 2.—Family Prayers. Edited by Lyman Abbott, D.D. 12mo, 455 pp. Price $1.50. New York: Dodd, Mead & Company.

This is a well-arranged manual for use in family devotion. It embodies several features which commend themselves at first glance to those who are looking for a convenient book of the kind. For instance, the editor has aimed to make the service interesting to a general household, and so has selected for the Readings passages relating to the lives of Moses, David, Daniel, Christ, and Paul, and numerous utterances of practical counsel and spiritual experience from the Psalms and Epistles. Special occasions also have their appropriate Readings and Prayers. Much care and good taste are shown in the compilation of Part II., the editor having drawn from the best sources, and supplied an abundant variety, as in the case of the Readings, anticipating special wants both of the individual and the family.

AN UNEXPECTED RESULT, AND OTHER STORIES. By E. P. Roe. 12mo, cloth. Price 75 cts. Dodd, Mead & Co., New York.

This is a comparatively new phase of writing for the well-known horticulturist and author. He gives us a love-story, of which the title appears to us to be a misnomer, for we surely would have called it "An Expected Result," after the first four pages. A jilted lover, desperate, goes off to Brazil to try his best to catch the fever and die; a friend left behind promises to seek out the jilter, and, by winning her love, and then jilting her, to avenge the absent. The friend wins her love, but, instead of jilting, marries her, and the first desperate lover finds a girl in Brazil who soothes his wounded heart, and does not jilt him. Of much greater merit is the "Christmas Eve in War Times," being probably a true incident of the dark days of the late civil war, when want looked in at the door of many a home left behind by the men who were fighting the nation's battles. We commend it as a sample of good delineation, especially as regards the conduct of the house-agent.

DEEP BREATHING as a Means of promoting the Art of Song, and of Curing Weaknesses and Affections of the Throat and Lungs, especially Consumption. By Sophia Marquise A. Ciceolina. Illustrated. Translated from the German, by Edgar S. Werner. 12mo, pp. 48. New York: M. L. Holbrook & Co.

This is a little book which one can read in an hour or so, but it is filled with good counsel on the use of the lungs. The fact that upon the development and power of the lungs depends the strength of the individual in every branch of his mental and physical life needs no special argument here; every intelligent reader will at once affirm it, and also the logical conclusion it forces that one must breathe well, deeply, thoroughly, to have well-developed lungs, and a correspondingly energetic life. For speakers and singers the book can be commended warmly, as well as to those who are weak, or think they are, in the respiratory organs.

EXTEMPORE SPEECH: How to Acquire and Practice it. By William Pittenger, author of "Oratory," and "Capturing a Locomotive." 12mo, pp. 275. Price $1.50. Philadelphia: National School of Elocution and Oratory.

There are many who can use the faculty of language with much freedom; that is, they are seemingly prepared to say something on every occasion, but what they say is usually found on analysis to be wanting in that appositeness and point which are essential to practical impression and utility. The author of the book before us is a gentleman experienced as a writer and a teacher in the line of elocution, and his opinion that good speech is the result of study and special preparation, is in accord with sound judgment. We believe in extempore speech as "the most natural, logical, impassioned, and effective mode of discourse," but no such characteristic will be found in the talk of the untrained, unlearned man. From Demosthenes to Gladstone, the great speakers of history obtained their fame as orators only by study and practice.

Mr. Pittenger is very encouraging in his suggestions with regard to the attainment of a graceful and effective style of address through following a method of preparation, and in this book he formulates what he regards as such a method. This involves education, the training of the faculties, the development of the vocal organs, as preliminary and associated with the special object. Models of preparation for a particular speech are supplied, with abundant suggestions for gathering material and working it up into forms convenient for use.

EFFIE RAYMOND'S LIFE-WORK, GOING WITH THE STREAM, and other Stories. By Jeannie Bell. 16mo, pp. 270. Price $1. Address J. N. Stearns, Publishing Agent, 58 Reade Street, New York.

This is a new book for Sunday-school libraries, just published by the National Temperance Society. There are several stories, all teaching important temperance lessons, and also others equally important in a right life.

A REPLY to "The Academy's Review" of "The Wine Question in the Light of the New Dispensation." By John Ellis, M.D., author of "The Avoidable Causes of Disease, Insanity, and Deformity," etc. 12mo, 270 pp. Published by the author. New York.

This is an attractively bound book of 270 pages, and, as a defense of Swedenborg and his teachings regarding the use of wine, will probably have some value to those interested in his views of the subject. The main issue between "The Academy" and the learned physician appears to be a quibble as to the sense in which Swedenborg used the word "wine," the "Academy" understanding the term as it is more commonly understood at the present day; while Dr. Ellis as constantly maintains that the word was only used by Swedenborg as representing *unfermented* grape-juice, or juice in which there is no alcohol.

In the endeavor to defend his position, the doctor urges the fact that the ancients used *unfermented* grape-juice and preserved it for a length of time, calling it "wine"; but as Emanuel Swedenborg died only eighty-nine years ago, it can hardly be claimed that his understanding of the term "wine" and the understanding of the term by those who wrote two thousand or more years ago should be identical.

This in the main, with some scientific pages

on the effect of whisky or alcohol on the human system, observations of a general character upon wine in different parts of the world, and a free use of personalities of a not very complimentary nature, which we should judge were more than provoked by "the Academy," makes up the balance of the book.

To those interested in the derivation of words, together with the changes that words undergo in the course of time, and the tracing of them through these changes, the book offers some quite instructive reading; the chapter especially on the wine of the early Christian Church, the Passover Wine, etc., is well written, and possesses merit.

WORDS OF COMFORT. From the prayers of Joseph Parker, Minister of the City Temple, London. Selected by Amelia M. Fowler; published by L. N. Fowler, Imperial Buildings, London.

The arrangement of this very tastefully-prepared volume is in accordance with the plan of a birth-day book, but in some respects we think it superior to the average compilation of this popular type. The selections have a practical application in our every-day, commonplace life, and are suggestive of hope, patience, and encouragement. Three short quotations from the prayers are selected for each day, and a motto for each month is also selected from the same rich source. We can very sincerely recommend this little book to the notice of our readers.

PUBLICATIONS RECEIVED.

MORAL AND LEGAL FORCE. By George Lansing Taylor, D.D. This is an argument for the purpose of showing the uses and success of moral suasion in temperance work. It also urges the necessity of employing legal methods for the suppression of intemperance. Price 10 cents. J. N. Stearns, Publishing Agent, New York.

BLACKBOARD TEMPERANCE LESSONS. By Mrs. W. F. Crafts. Includes twelve choice and instructive lessons, with illustrations designed for the blackboard. Adapted to delivery before temperance associations of all kinds. Price 10 cts.

ETHICS AND POLICY OF PROHIBITION. By C. J. Chubbuck. A strong paper on the right of coercive prohibition. Price 5 cents. Both sold by above Agent.

AN OPEN LETTER, written in answer to certain inquiries touching religious belief. Read to the congregation of the Church of the Unity, Cleveland, Ohio. By the Rev. L. S. Hosmer.

THE SIXTY-THIRD ANNUAL REPORT of the Board of Directors of the Mercantile Library Association of the City of New York.

SUMMER HOMES AND RAMBLES ALONG THE ERIE RAILWAY, issued by the general passenger department of the road, supplies information to those who are looking for temporary residences during the summer in pleasant neighborhoods, beyond the smoke and dust and din of the city.

POPULAR SCIENCE MONTHLY, for July, discusses the Railroad Problem of the United States, Remedies of Nature for Dyspepsia, The Great Bridge and its Lessons, Chemistry of Cookery, The Industrial Position of Women, and other things of current value.

RESUSCITATED: A Dream or Vision of the existence after death. Discourse of Lucifer on national, social, religious, and scientific topics, principally about the United States of America. This pamphlet comes from Sacramento, Cal., and exhibits some invention on the part of the writer. It is an imaginary conference with the chief of the regions infernal, in the course of which, the writer delivers himself of opinions upon matters and things in general, points out the seeming tendencies of the age toward monopoly, aristocratical assumption, demagogism, etc. He has something to say with regard to drugs and the adulteration of food, and frauds everywhere. We think Lucifer overreaches himself in this conference, by disparaging so many of the means which are usually regarded as directly in his interest.

THE CENTURY, for July, is a prime number, more than usually freighted with articles on vital topics: for instance, we have a finely illustrated article on Striking Oil; Old and New Races, is most artistically treated; Flood and Plague in New Orleans is very interesting, and so also is the John Brown Raid.

THE NORTH AMERICAN REVIEW, for July, contains, among its leading papers: The Last Days of the Rebellion, by Gen. Sheridan; The Increase of Public Expenditures; Needed Reforms in Prison Management; Sanitary Drainage; and Church Attendance, by a syndicate of writers.

TEA. The drink of pleasure and of health. By W. Gordon Staples, C.M., M.D., R.N., etc. Published by Field & Tuer, of The Leaden Halle Press, London. This is an account of the history and cultivation of tea, and its use as a beverage, and its assumed use hygienically. From the point of view of the physiologist, we must take issue with the writer, on the sanitary question of tea-drinking. We think that he has had more in view the preparation of a book for mercantile or literary purposes, than one designed to instruct and benefit its reader.

THE CINCINNATI MEDICAL NEWS. This is one of our medical exchanges which we examine with interest. It is well edited and quite comprehensive in its survey of current topics belonging to its sphere.

THE HOMILETIC MONTHLY is worthy of particular notice. Each month half a dozen or more sermons from the pulpits of distinguished ministers are given in full or in great part, and it contains much other matter of special value to those related to pulpit work.

PRACTICAL CARPENTRY. Being a guide to the correct working and laying out of all kinds of carpenters' and joiners' work, to which is prefixed a thorough treatise on carpenters' geometry. 12mo, pp. 143, price $1.00. A convenient book for the workman, especially the average journeyman, and all carpenters who have not had time or opportunity to become instructed in the scientific principles of their trade. It contains a large amount of practical instruction, within a small compass. The illustrations are numerous, being upward of three hundred, six of them being full-page plates, showing the methods for making joints of large and small timber. A practical man would at once appreciate the book, should it come into his hands. Published by the Industrial Publishing Co., John Phin, agent, New York.

THE AMERICAN INSTITUTE OF CHRISTIAN PHILOSOPHY has been in existence but a short time, but being composed of men warmly interested in their work, considerable progress has been made. This year, two schools will be held instead of one as heretofore, one at Atlantic Highlands, New Jersey, the delightful sea-shore resort, easily accessible by steamer from New York; the other will open at Richfield Springs, near Utica. The series of lectures delivered at Atlantic Highlands will cover a week, commencing August 24, and ending August 7th; that at Richfield Springs will extend from August 21st to August 31st.

GOLDEN THREADS, by Ernest Gilmore, is a new volume from the press of the National Temperance Society, descriptive of life very much as it should be in a well-ordered Christian family, and contrasted with that which is usually incident to the family of worldly, selfish, sensual relations. The book has many good features, adapting it to the reading of children. Price $1.00. J. N. Stearns, Agent, New York.

HARPER'S NEW MONTHLY MAGAZINE, for July, is rich in descriptive matter, foreign and domestic. The entertaining sketches from Russian History are continued, this time the instalment having a special interest because of the late coronation of the Czar; glimpses of the life of the reigning family are given with pen and pencil. A sketch, finely illustrated, of Cincinnati, is included among the attractions of the Number.

THE NATIONAL RAILWAY AND STEAM NAVIGATION GUIDE, published by D. Appleton & Co., continues, as it has ever been, the convenient railway handbook of the American traveler. Published monthly. G. F. Thomas, Editor.

RESPIRATORY CONTROL, for vocal purposes; Inspiration and Expiration. By John Howard. Published by Edgar S. Werner, of Albany, N. Y. Price, 60 cents. A well-written pamphlet of especial use to those who exercise their vocal organs in pulpit or on platform; written in a style clear and familiar, and furnishing advice of great value. Too many of our speakers and singers use their voices improperly, or rather the organs which produce the voice, and as a consequence break down in mid-career; the organs having become weakened, exhausted, paralyzed. Mr. Howard shows the right way to exercise them, which secures their free and normal play, and consequent development to a stronger and more efficient condition.

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